Forum 15 Oblats LP

15 OBLATS AVENUE
STORMWATER MANAGEMENT REPORT

AUGUST 23, 2024

15 OBLATS AVENUE STORMWATER MANAGEMENT REPORT

Forum 15 Oblats LP

4TH SUBMISSION

PROJECT NO.: 221-02976-00
CLIENT REF:
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WSP
SUITE 300
2611 QUEENSVIEW DRIVE
OTTAWA, ON, CANADA K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
WSP.COM

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SIGNATURES

PREPARED BY

Kathryn Kerker
Designer, Water Resources

August 24th, 2024
Date

APPROVED[1] BY

Bryan Orendorff, P.Eng.
Manager, Water Resources

August 24th, 2024
Date

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CONTRIBUTORS

CLIENT

FORUM 15 Oblats LP, Vimal Lad

WSP

Water Resources, Designer	Kathryn Kerker
Water Resources, Project Engineer	Ayham Jadallah
Water Resources, Project Engineer	Alex Sereda
Water Resources, Manager	Bryan Orendorff

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1 INTRODUCTION

1.1 SCOPE

WSP Canada Inc. was retained by Forum 15 Oblats Limited Partnership to prepare a Stormwater Management (SWM) report for the proposed retrofit of an existing 4-storey residential building and a 4-storey addition to the north-west consisting of residential units. This SWM report examines the potential water quality and quantity impacts of the proposed development and summarizes how each will be addressed in accordance with applicable guidelines.

1.2 SITE LOCATION

The proposed development is located at 15 Oblats Avenue, Ottawa, Ontario. The subject site is bounded Oblats Avenue to the south, Springhurst Avenue to the north and residential properties to the east and west. The site is located between the Rideau River to the east and the Rideau Canal to the west. The location of the proposed development is illustrated in Figure 1

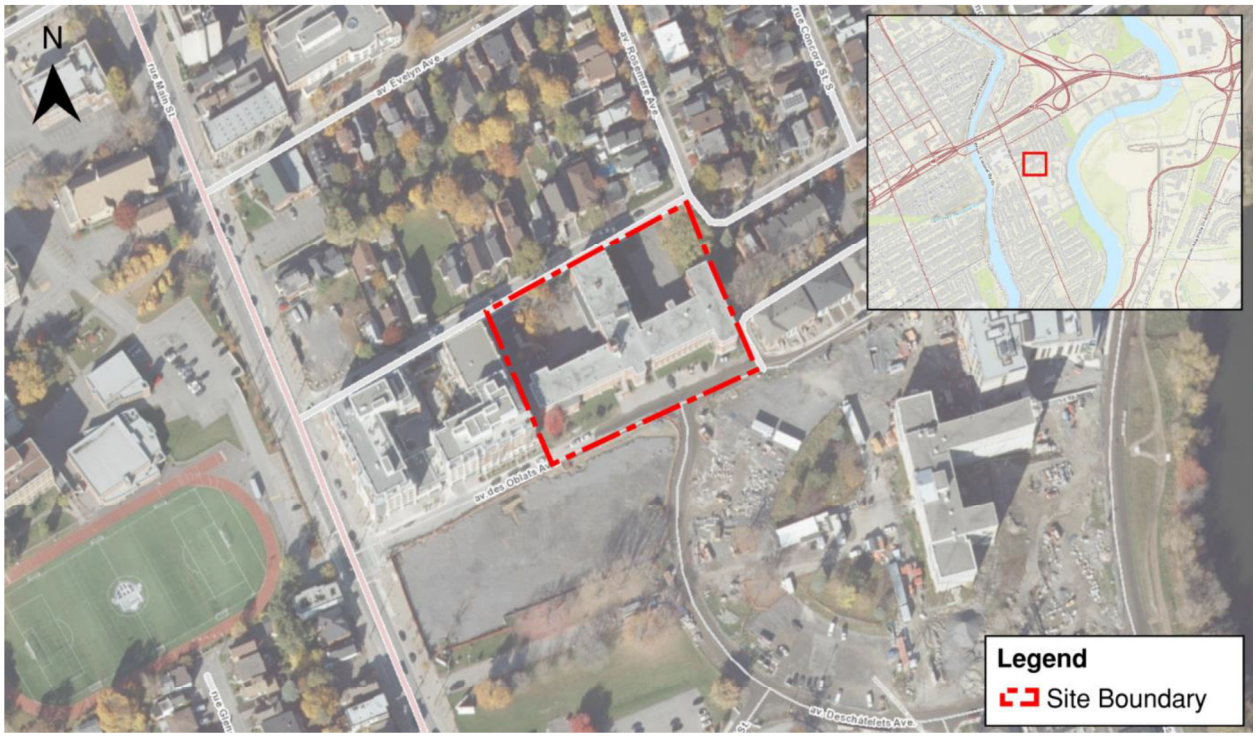

Figure 1: Project Location

1.3 STORMWATER MANAGEMENT PLAN OBJECTIVES

The objectives of the stormwater management plan are as follows:

- → Collect and review background information.
- → Determine the site-specific stormwater management requirements to ensure that the proposals are in conformance with the applicable Provincial, Municipal and Conservation Authority stormwater management and development guidelines.
- → Evaluate various stormwater management practices that meet the applicable SWM and development requirements and recommend a preferred strategy.
- → Prepare a stormwater management report documenting the strategy along with the technical information necessary for the justification and sizing of the proposed stormwater management facilities.

1.4 DESIGN CRITERIA

Design criteria were taken from the Pre-Application Consultation Meeting with the City of Ottawa on May 27th, 2021 (meeting notes included in **Appendix A**). Criteria for the 15 Oblats development are as follows:

- → **Stormwater Quantity-** control post-development flows (2 to 100-year storm events) to the 2-year pre-development discharge with a runoff coefficient that is the lesser of the actual runoff coefficient or 0.5 per City of Ottawa Standards for a redevelopment.
- → **Storm Quality-** Per correspondence with the Rideau Valley Conservation Authority (RVCA), there are no water quality criteria for this site. Best practices stormwater management approaches will be applied. RVCA correspondence is included in **Appendix A**.

2 PRE-DEVELOPMENT CONDITIONS

2.1 GENERAL

Under existing conditions, 15 Oblats Avenue is currently developed with an existing four (4) storey building, paved parking, and some recreational green space. Vehicular access to the site is via Oblats Avenue to the south and Springhurst Avenue to the north.

Under existing conditions, the site drains to two outlets. The north portion of the site, including the existing building, drains to the existing 1350 mm storm sewer along Springhurst Avenue while the area south of the building drains overland to the existing 375 mm sewer along Oblats Avenue. Ultimately, all runoff from the site discharges to the Rideau River to the east.

Weighted runoff coefficients were based on the pre and post development land use. Runoff coefficients used for different land covers are summarized in Table 1.

Table 1: Runoff Coefficients

LAND USE	RUNOFF COEFFICIENT, C
Pervious area (grass, gardens, etc.)	0.25
Impervious Area (parking, pathways, building, etc.)	0.90

As shown on Figure 2 and summarized in Table 2, the proposed site is an approximately 0.68 ha area composed of building, parking, and landscaped area with runoff coefficients of 0.47 and 0.74 for areas EX-001 and EX-002 respectively. However, as discussed in section 1.4, per City of Ottawa criteria, a runoff coefficient of 0.50 was used when evaluating pre-development peak flows for the area EX-002.

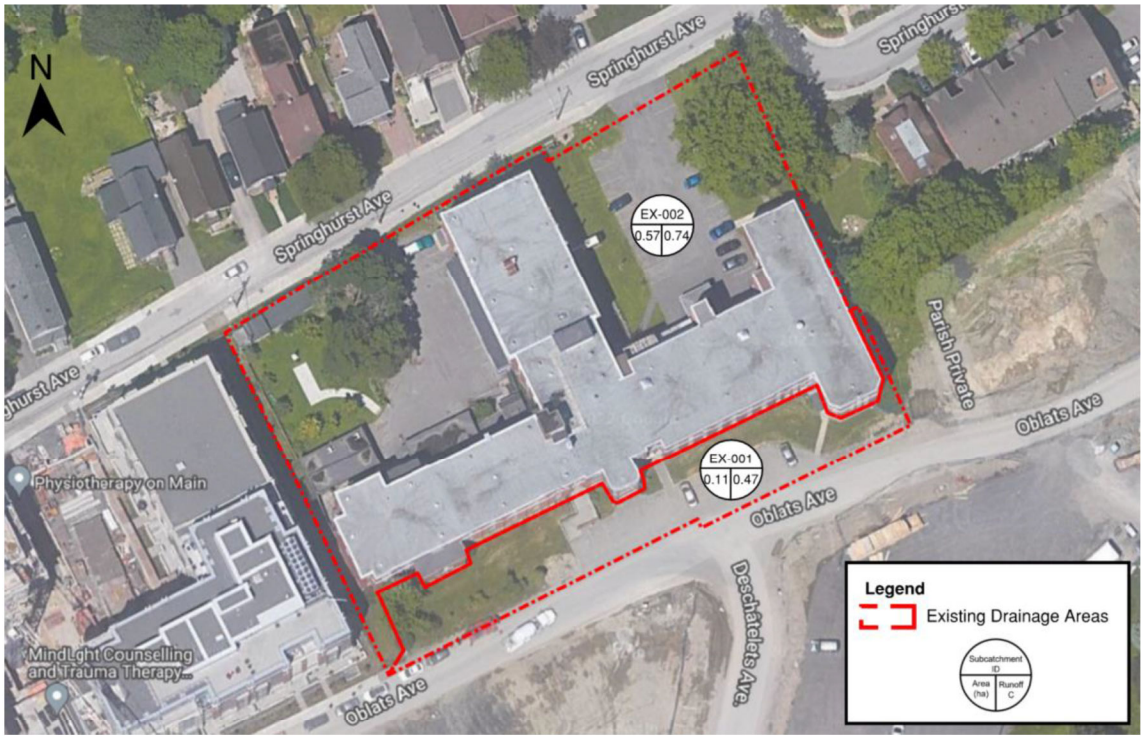

Figure 2: Existing Conditions Catchment Area

Table 2: Existing Land Use Area Breakdown

Catchment ID	AREA (ha)	% COVERAGE OF PROJECT AREA	RUNOFF COEFFICIENT
OF-001 (Oblats Ave)			
EX-001	0.11	16%	0.47
OF-002 (Springhurst Ave)			
EX-002	0.57	84%	0.74*
TOTAL SITE AREA	**0.68**	**100%**	**0.70**

*Runoff Coefficient of 0.50 used in evaluating pre-development peak flows per the City of Ottawa Sewer Design Guidelines (Section 8.3.7.3)

2.2 RAINFALL INFORMATION

The rainfall intensity is calculated in accordance with Section 5.4.2 of the Ottawa Sewer Design Guidelines (October, 2012):

Where;

$$i = \left[\frac{A}{(Td + C)^B}\right]$$

- A, B, C = regression constants for each return period (defined in section 5.4.2)
- i = rainfall intensity (mm/hour)
- Td = storm duration (minutes)

The IDF parameters / regression constants are per the Ottawa Sewer Design Guidelines (October, 2012).

2.3 ALLOWABLE FLOW RATES

As noted in section 1.4, it is required that post development peak flows, up to and including the 100-year storm event, be controlled the 2-year pre-development conditions. Per correspondence with the City of Ottawa (**Appendix A**), the area south of the building (EX-001) will be allowed to continue to drain uncontrolled to Oblats Avenue, while flow to Springhurst Avenue (EX-002) will be controlled to the 2-year pre-development conditions for events up to and including the 100-year.

HydroCAD software was used to calculate the pre-development peak flow rates for the 2 through 100-year storm events, results are summarized in Table 3. Detailed Rational Method calculations is included in **Appendix C**.

Table 3: Pre-Development Peak Flow Rate Calculations (Based on T_d = 10 minutes, C_{OF-001} = 0.47, C_{OF-002} = 0.5)

OUTLET	PEAK FLOW (L/S)					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
OF-001 (Oblats Ave)	11	15	17	23	27	32
OF-002 (Springhurst Ave)	**60**	81	95	124	151	175
TOTAL	**71**	**96**	**112**	**146**	**178**	**207**

*Runoff coefficients increased by 10%, 20%, and 25% for the 25-year, 50-year, and 100-year storms respectively per the City of Ottawa Sewer Design Guidelines (Section 5.4.5.2.1)

Therefore, the target release rate to Springhurst Avenue is 60 L/s.

3 POST-DEVELOPMENT CONDITIONS

3.1 GENERAL

The proposed development includes a four (4) storey addition to the northwest corner of the existing building, as well as some landscaping changes throughout the rest of the site. Under proposed conditions the site will continue to be accessed from both Oblats Avenue and Springhurst Avenue.

An estimated area breakdown of the proposed site layout is summarized in Table 4 and shown in **Exhibit 1** (**Appendix B**).

Table 4: Proposed Land-Use Area Breakdown

Catchment ID	AREA (ha)	% COVERAGE OF PROJECT AREA	RUNOFF COEFFICIENT
OF-001 (Oblats Ave)			
PR-001 (Uncontrolled)	0.11	16%	0.40
OF-002 (Springhurst Ave)			
PR-002 (Controlled)	0.240	37%	0.90
PR-003 (Controlled)	0.132	20%	0.89
PR-004 (Controlled)	0.049	8%	0.75
PR-005 (Controlled)	0.056	9%	0.60
PR-006 (Controlled)	0.031	5%	0.42
PR-007 (Uncontrolled)	0.037	6%	0.25
PR-008 (Uncontrolled)	0.021	3%	0.76
PR-009 (Uncontrolled)	0.005	1%	0.90
Sub Total	0.571	88%	0.78
TOTAL SITE AREA	**0.651**	**100%**	**0.75**

To meet the stormwater management objectives, as defined by the design criteria outlined in Section 1.4, the following components have been proposed:

- → Underground Stormtech chambers located under the north-east parking area
- → Flow controlled with an inlet control device (ICD)
- → Oil and Grit Separator (OGS) for parking area runoff

The application and sizing of these proposed stormwater management facilities is outlined in the following sections.

3.2 WATER QUANTITY

As previously noted, it is required that post development discharge rates for the 2 through 100-year storm events be controlled to the 2-year pre-development conditions. However, per correspondence with the City of Ottawa (**Appendix A**), the 0.11 ha area south of the building (PR-001) will continue to drain uncontrolled to Oblats Avenue. Best efforts have been made to reduce the impervious area draining uncontrolled to Oblats Avenue, with similar land cover under existing and proposed conditions (C=0.47 vs. C=0.40).

As summarized in Table 4, of the 0.57 ha area draining to Springhurst Avenue approximately 0.063 ha will drain uncontrolled while the remaining 0.51 ha, including the existing building and proposed addition, will be captured and controlled within the proposed underground Stormtech unit. It should be noted that the controlled areas to OF-002 will be controlled such that the total flow to Springhurst Avenue, including the uncontrolled areas, will meet the 2-year pre-development condition.

HydroCAD software was used to model the behaviour of the proposed SWM system and determine its response under various storm events. The software calculates flow rates and related storage values and identifies the critical duration for different components of the system. For this site, the critical storm duration (100-year) for peak discharge to Springhurst Avenue occurs at 35 minutes, however, the maximum storage utilized occurs at 36 minutes.

It was determined that a minimum of 160 m^3 storage unit controlled with a HYDROVEX 200-VHV-2 type ICD is sufficient to meet the quantity control requirements. A summary of the modeling results is provided in Table 5 and Table 6, detailed HydroCAD output is included in **Appendix C**.

Table 5: Summary of HydroCAD Modelling Results – Peak Flows

OUTLET	PEAK FLOW (L/S)					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Existing Conditions						
OF-001 (Oblats Ave)	11	15	17	23	27	32
OF-002 (Springhurst Ave)	**60**	81	95	124	151	175
Proposed Conditions						
OF-001 (Oblats Ave)	9	12	14	18	22	26
OF-002 (Springhurst Ave)	20	31	39	49	54	**60**

*Runoff coefficients increased by 10%, 20%, and 25% for the 25-year, 50-year, and 100-year storms respectively per the City of Ottawa Sewer Design Guidelines (Section 5.4.5.2.1)

Table 6: Summary of HydroCAD Modelling Results – Peak Storage

Return Period (Years)	Time of Conc. (min)	Utilized Storage	Total Flow to OF-002	Max Elevation in Storage Unit	ICD Flow at Max Head	Allowable 100-yr Flow Rate to OF-002
		(m^3)	(L/s)	(m)	(L/s)	(L/s)
100 (Peak Discharge)	35	160	**60**	62.233	54	**60**
100 (Peak Storage)	36	160	60	62.234	54	

The Stormtech chamber elevation was set at 60.60 m to be above the 100-year maximum HGL in the receiving storm sewer (60.03 m at MHST65280 per City comments). Emergency overflow from the storage system is directed toward the right-of-way as indicated in the grading plan. Details of the proposed storage system are included in Appendix D.

3.3 WATER QUALITY

As per Section 1.4, there are no specific quality control criteria for this site. Therefore, best practice stormwater management approaches have been applied.

All building, pathway, and landscaped area will be generally free of typical sediment generating activities and runoff will leave the site effectively unchanged and can therefore be considered clean for the purposes of water quality assessment.

All runoff from the remaining parking area in the north-east corner of the site will be captured within the proposed underground storage unit. A suitably sized OGS unit (Stormceptor EFO4 or equivalent) has been proposed at the outlet of the storage unit to provide 80% TSS removal.

4 CONCLUSIONS

A stormwater management report has been prepared to support the design of a proposed four storey addition to the existing residential building complex at 15 Oblats Avenue. The key points are summarized below.

WATER QUANTITY

Controlled runoff from the site will be detained in a 160 m^3 underground Stormtech chamber and released at a controlled rate using a HYDROVEX 200-VHV-2 type ICD (or equivalent).

WATER QUALITY

Per correspondence with the RVCA, no water quality infrastructure is required. Per best practice, all parking area will be treated with an OGS unit (Stormceptor EFO4 or equivalent) sized to achieve 80% TSS removal.

This report has demonstrated the proposed SWM strategy will address stormwater management related impacts from this project and meet the applicable design requirements.

APPENDIX

A PRE-CONSULTATION MEETING MINUTES AND RVCA CORRESPONDENCE

Pre-Application Consultation Meeting Notes

15 Oblats Avenue

PC2021-0140

Thursday, May 27, 2021
1:30-3pm via Microsoft Teams

Attendees:

City of Ottawa:
Andrew McCreight, File Lead
Holly Newitt, Planning student
Josiane Gervais, Transportation
Luis Juarez, Heritage
Mark Richardson, Forestry
Nishant Jhamb, Engineering
Randolph Wang, Urban Design

Applicant Team:
Lisa Dalla Rosa
Brian Casagrande
Jeremy Silburt
Aly Damji
Ryan Denyer
Andrew Levitan

Community Association Representative:
Paul Goodkey
Phyllis Odenbach-Sutton

Subject: 15 Oblats

Meeting Notes:

Opening & attendee introduction

- Introduction of meeting attendees
- Confirmation that the Community Association representatives are subject to Non-Disclaimer Agreements (NDA).
- If it is intended to speak with the broader Community Association or general public, please consider waiving the NDA requirements for this proposal.

Proposal Overview (Applicant Team)

Note: Presentation provided (requested for sharing post meeting)

Ryan Denver, Smart Living Properties & Aly Damji, Forum

- Introduction of Forum and Smart Living Properties
    - Forum Equity Partners = Toronto based private equity firm, private and public partnerships
    - Smart Living Properties = Ottawa-based real estate development company
        - Specialize in fully furnished, all-inclusive rental buildings
    - 3rd project of the partnership within Ottawa
        - Focused on adaptive reuse
        - Smaller than average units with larger amenity spaces that are more financially attainable

Lisa Dalla Rosa, Fotenn

- Site history & context of the neighbourhood
    - Building not defined as historic but there are conditions regarding a statue
    - Highly walkable
    - Majority of surrounding options are condos and larger units that are more expensive
- Currently designated General Urban Area
    - Supports heights up to 4 storeys
- Subject to Old Ottawa East Secondary Plan
    - Residential low-rise on Springhurst
    - Residential mid-rise on Oblats
- Recent BHSC direction on the statue and heritage commemoration
- Split Zoning on site
    - R4-UD on Springhurst
    - R5 on Oblats
- Potential Development Options were created and debated
    - Proposed development is a hybrid
- 340 units, reduced parking, reduced 2-bedroom units (R4)
- Proposal will require zoning change for a reduction in parking spaces and reduction in provided 2-bedroom units (R4 requirement)
    - All parking is surface parking
    - Biking parking of .5 per unit
- Amenities intended for residents only; pool, gym, other co-living lifestyle features.
    - 87 Mann is Ottawa example of building type with furnished suites etc.
- Pathway / parkette will connect Springhurst and Oblats along the West side of the property
    - Including a new statue location and informative plaque
- Cantilevered units to complete Springhurst streetscape and reduce visual of surface parking
- Façade on Springhurst a mix of red brick and more modern materiality

- Limited changes to Oblats façade
- Timeline = Move-in 2024

Clarification Questions (at meeting)

- Any non-residential uses proposed beyond amenities for tenants?
    - Tenants only.
- Did you mention a pathway connection?
    - Yes, along west side of property.
- Phyllis
    - Springhurst units – where are the basement suites in images?
        - Will need clarify on the basement units
    - Pool image shows basement windows
- Randolph
    - Parapet height – 2ft
    - Existing elevators? – yes, in middle of "T"
    - Setback on addition to west side. About 5m setback.
    - Parking along Oblates – existing? And expanding. For visitor or resident…. Intended for visitor use. 16 spaces current exist, we are adding 5.
    - Where is main entrance?
        - Oblates middle
- Luis
    - Is exterior architecture being retained. Yes, that is the intent. Some to be rpac

Technical Comments

Luis Juarez, Heritage

Adaptive Reuse of the Convent

- Heritage staff are supportive of the adaptive reuse of the existing convent building for new residential and associated amenity uses.
- Staff do not object to new additions to the existing building subject to design refinements suggested by Urban Design and Development Review Staff. In any case, the additions should be located away from the Oblats frontage, complimentary and subordinate to the existing convent, and of their own time.
- Please indicate which (if any) architectural design features will be altered or removed as part of this development (i.e. confirm if windows/doors will be replaced, etc.).
- A conservation plan will be required to outline the conservation approach for the property. In addition to describing the conservation and relocation approach for the statue, the plan should also describe how the covenant building and its design features

will be preserved or restored, and outline recommendations for the long-term maintenance of the property's heritage value.

Proposed Statue and Garden Relocation and Commemoration

- Heritage staff are not opposed to the relocation of the statue along des Oblats Avenue as proposed, or along the Springhurst Avenue bend to facilitate the additions. In any case, the statue's location should be highly visible and accessible to the public.
- Ensure that the statue is protected during its relocation and that it be restored to its original condition once relocated if required. The relocation approach should be detailed in the conservation plan.
- The Ottawa East Secondary Plan mentions a grove of trees that were transplanted to the statue's current location. Clarify if these trees remain, and if so, if they can be transplanted to the statue's proposed location. The statue area shall be well landscaped to maintain the essence of the prayer garden that currently exists.
- The April 2021 BHSC motion requests a meaningful commemoration component be added to the property. A plaque and/or interpretation panel should be erected alongside the statue to commemorate the Order and their work in education, health care and social services in Ottawa East. Heritage Staff would like to work with the Applicant on the content of the commemoration component.

Nishant Jhamb, Engineering

Please forward the below information to the applicant regarding a development proposal at **15 Oblates Ave to convert the existing building to approximately 176 rental apartments and then construct 2 additions on to the north side for a further 158 units**. Note that the information is considered **preliminary** and the assigned Development Review Project Manager may modify and/or add additional requirements and conditions upon review of an application if deemed necessary.

General:

- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided and all easements shall be shown on the engineering plans.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.
- A **Record of Site Condition (RSC) in accordance with O.Reg.** 153/04 will be required to be filed and acknowledged by the Ministry prior to issuance of a building permit due to a change to a more sensitive property use.
- Existing sanitary and storm service require a CCTV inspection and report to ensure existing services to be re-used are in good working order and meet current minimum size requirements. Located services to be placed on site servicing plans.

- All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not extend either above or below into the existing property lines and sight triangles.
- Reference documents for information purposes:
  - Ottawa Sewer Design Guidelines (October 2012)
  - Technical Bulletin PIEDTB-2016-01
  - Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
  - Ottawa Design Guidelines - Water Distribution (2010)
  - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
  - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
  - City of Ottawa Environmental Noise Control Guidelines (January 2016)
  - City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
  - Ottawa Standard Tender Documents (latest version)
  - Ontario Provincial Standards for Roads & Public Works (2013)

  Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

  Please note that this is the applicant responsibility to refer to the latest applicable guidelines while preparing reports and studies.

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Stormwater Management Criteria and Information:

- **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the **100-year storm event**, to **a 2-year pre-development level.** The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. [**If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5**]. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *Tc should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- Any storm events greater than the established **2-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Document how any foundation drainage system will be integrated into the servicing design and show the positive outlet on the plan. Foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. **It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.**
- **Water Quality Control:** Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.
- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 5-year storm rainfall event**.
- **Underground Storage:** If underground storage is proposed please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.
- When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**
    - In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.
    - Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc. UG storage to provide actual 2- and 100-year event storage requirements.

- In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.
- Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

- Minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.
- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution**.
- **If rooftop control** and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the foundation drain system. Provide a **Roof Drain Plan** as part of the submission.
- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.
- Rear yard on grade parking to be permeable pavement. Refer to City Standard Detail Drawings SC26 (maintenance/temp parking areas), SC27 or permeable asphalt materials. No gravel or stone dust parking areas permitted.
- Street catchbasins are not to be located at any proposed entrances.

Storm Sewer:

- 1350mm Conc (1965) is available on Springhurst Ave. and 375mm PVC(2017) is available on Oblats Ave.
- A storm sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.

Sanitary Sewer

- A 450mm Conc(1934) is present on Springhurst Ave. and 250mm PVC(2017) available on Oblats Ave.
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01.*

- Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- A backwater valve is required on the sanitary service for protection.
- Include correspondence from the Architect within the Appendix of the report confirming the number of residential units per building **and a unit type breakdown for each of the buildings** to support the calculated building populations.

Water

- A 200 mm dia. PVC watermain (2011) is available within Springhurst Ave and 254mm PVC(2017) is available on Oblats
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m^3/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration.* The basic day demand for this site not expected to exceed 50m^3/day.
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.
    - Type of Development and Units
    - Site Address
    - A plan showing the proposed water service connection location.
    - **Average Daily Demand** (L/s)
    - **Maximum Daily Demand** (L/s)
    - **Peak Hour Demand** (L/s)
    - **Fire Flow** (L/min)
        - [*Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS)** Water Supply for Public Fire Protection 1999*]
        - *Exposure separation distances shall be defined on a figure to support the FUS calculation and required fore flow (RFF).*
- **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved**. Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Snow Storage:

- Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patters or

servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Wind impact on the pathway:

- If the proposed building alignment is to stay the same as submitted during pre-consult meeting, please discuss the wind impacts on the proposed pathway on west side of the proposed building.

Sensitive marine clay-

- If Sensitive marine clay soils are present in this area that are susceptible to soil shrinkage that can lead to foundation and building damages. All six (6) conditions listed in the Tree Planting in Sensitive Marine Clay Soils-2017 Guidelines are required to be satisfied. Note that if the plasticity index of the soil is determined to be less than 40% a minimum separation between a street tree and the proposed building foundations of 4.5m will need to be achieved. A memorandum addressing the Tree in Clay Soil Guidelines prepared by a geotechnical engineer is required to be provided to the City. https://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/design-and-planning/completed-guidelines/tree-planting-sensitive-marine-clay-soils-2017-guidelines

Severance:

- If severance is planned, this needs to be addressed in servicing to satisfy severance requirements. Where a large parcel with multiple buildings is planned, City will require an ultimate servicing plan so as to appropriately understand how severance requirements are being met.

Gas pressure regulating station

- A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Gas Pressure Regulating Station.pd

Source Protection Policy Screening (SPPS):

- Here is a summary of the Source Protection policy screening for 15 Oblats Ave.
    - The address lies within the Mississippi-Rideau Source Protection Region and is subject to the policies of the Mississippi-Rideau Source Protection Plan.
    - The area is not located within a Surface Water Intake Protection Zone (IPZ) where significant threat policies apply.
    - The area is not located within a Wellhead Protection Area (WHPA).
    - The area is not located within a Significant Groundwater Recharge Area (SGRA).

- The area is located within a Highly Vulnerable Aquifer (HVA). There are no legally-binding source protection policies related to activities within Highly Vulnerable Aquifers.

- In terms of the development application, please note that the address is not located in an area where activities could be considered a significant threat to drinking water sources and there are no legally-binding source protection policies

CCTV sewer inspection

- CCTV sewer inspection required for pre and post construction conditions to ensure no damage to City Assets surrounding site.

Pre-Construction Survey

- Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

Road Reinstatement

- Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s). https://ottawa.ca/en/business/permits-and-licenses/right-way/road-cut-permit#resurfacing-requirement

Required Engineering Plans and Studies:

- **Plans:**
  - Existing Conditions and Removals Plan
  - Site Servicing Plan
  - Grade Control and Drainage Plan
  - Erosion and Sediment Control Plan
  - Roof Drainage Plan
  - Foundation Drainage System Detail (if applicable)
  - Topographical survey
- **Reports:**
  - Site Servicing and Stormwater Management Report
  - Geotechnical Study/Investigation
  - Noise Control Study
  - Phase I ESA
  - Phase II ESA (Depending on recommendations of Phase I ESA)
  - RSC (Record of the site Conditions)
  - Site lighting certificate
- Please refer to the **City of Ottawa Guide to Preparing Studies and Plans [Engineering]:**

- Specific information has been incorporated into both the Guide to Preparing Studies and Plans for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.
- Added to the general information for servicing and grading plans is a note that an O.L.S. should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an O.L.S. for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.
- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4: https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety

RSC (Record of the site Conditions)

- A RSC is required when changing the land use (zoning) of a property to a more sensitive land use and **a memorandum prepared by an environmental consultant confirming that no potential contaminating activities have taken place within the RSC area since the filling of the RSC.**
  Submitting a record of site condition | Ontario.ca

ECA application

- The consultant shall determine if this project will be subject to an Environmental Compliance Approval (ECA) for Private Sewage Works. It shall be determined if the exemptions set out under Ontario Regulation 525/98: *Approval Exemptions* are satisfied. All regulatory approvals shall be documented and discussed in the report. If the SWM works and lateral are servicing one parcel of land under one ownership an ECA would not be required. Environmental Compliance Approval (ECA) for stormwater works the services more than one parcel of land.
  Environmental Compliance Approval | Ontario.ca

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Rreducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**.

https://documents.ottawa.ca/sites/default/files/documents/cap137602.pdf

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of Main street
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines. https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Exterior Site Lighting:

- Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a Certification (Statement) Letter from an acceptable professional engineer stating that the design is compliant.

Fourth (4th) Review Charge:

- Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

Construction approach

- Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead on this request.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

Josiane Gervais, Transportation

- Follow Traffic Impact Assessment Guidelines
    - A full TIA is required. Please feel free to submit the Scoping report to Josiane.Gervais@ottawa.ca at your earliest convenience.
    - Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
    - An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.
- Sidewalks along Oblats and Springhurst are required.

- The parking on Oblats as shown would require a depressed sidewalk and depressed curb along a large portion of the frontage, which would not be supported. In addition, the parking stalls are across from the Oblats/Deschatelets intersection as presented and would result in vehicles having to back out of parking stalls through this intersection which is undesirable.
- Private accesses must meet the Private Approach Bylaw.
- Because a reduction in parking is sought, the TIA and application should clearly demonstrate if/how Transportation Demand Management measures are to be provided. As an example, providing 1 bike stall per unit would be encouraged.
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
    - Turning movement diagrams required for internal movements (loading areas, garbage).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible.
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across accesses as per City Specification 7.1.
    - Grey out any area that will not be impacted by this application.
- As the site proposed is residential, AODA legislation applies for all areas accessible to the public and visitors (i.e. outdoor pathways a minimum width of 1.5m, accessible parking stalls and access aisles, etc.). Consider using the City's Accessibility Design Standards.

<u>Andrew McCreight, Planning</u>

- Plan and study list combined for concurrent SPC and ZBLA submission.
- Site is split zoned – there is a holding symbol on the property that will not be lifted until a site plan application is approved. See urban exceptions 1848 and 1846
- There is a zoning provision that includs lands west to Main Street – One lot for zoning purposes causes some confusion – you may want to include more detail in your ZBLA to make it part of the review.
- Secondary Plan
    - Schedule A - Split designation – Res low-rise (Springhurst), Res mid-rise (Oblates)
    - 10.2.2 – "3.An architectural conservation study will be undertaken with respect to any proposal for redevelopment of a property that is included on the Heritage Reference List as shown on 3.11 Heritage Resource Strategy. The study will determine the suitability of the existing buildings and landscape features for conservation or adaptive reuse as part of any redevelopment proposal. This study will be submitted as part of a Site Plan Control application." - Luis – apply?
    - Affordable Housing is encouraged. If rental, will some units be offered below AMR?
    - See 10.3.4 East side of Main Street Springhurst to Clegg, and as further detailed in the CDP.
    - Holding in SP

        - Site Plan Control application is approved that includes this entire area and fulfils the following conditions:
        - Stormwater management for the subject lands;
        - Traffic impact analysis and management plan;
        - Water and sewer servicing design; and
        - Parkland and pathway dedication relative to the development of the subject site.
    - Locate parking for the medium-rise buildings primarily below grade. Where necessary, surface parking related to all development in this precinct should be obscured from view by means such as placement behind buildings and landscaping.
    - Retain the statue of the Blessed Virgin and associated grove of trees to commemorate the Sisters of the Sacred Heart.
    - Architecture and materiality should reflect the areas character and history.
- Planning rationale – amenities must remain private to not trigger an OPA and further ZBLA. Clarify intent of amenities areas within the building.
- Secondary Plan - see Policy 10.2.2 – architectural conservation study
- Affordable housing is encouraged in the secondary plan – integrate in planning rationale
- East side of Mainstreet in Secondary plan – is very detailed in CDP
    - Secondary plan details holding process in more detail, will naturally happen through SPC
    - Parking provisions in there as well (primarily below grade),
    - Is the parking along Oblates historical or legally established?
        - Will need confirmation that existing parking is legal-non conforming? Staff will be looking for its removal and recapture this public realm with proper sidewalks and landscaping.
- Happy to see mid-block connection – make sure walkway is wide enough to have public engagement, to be owned and maintained privately, public access easement. Room for snow removal.
- More clarify required on basement units and how they related to height (storeys) and unit functionality.
- Tight relationship to western property; This is creates an undesirable built form relationship, and current design is not sensitively done.
- Internal courtyards seem tight – would like to see them open to east/west instead through re-design.
    - Resulting in an H-shape building, but less of a massing along Springhurst with the corners opened.
- Further analysis on sighting of the building needs to be done
- Statue should stay in the public realm – lots of opportunities on site for relocation while satisfying heritage direction (BHSC).
- Consider integrating car share services for any surface parking spots that remain (see Secondary Plan policies on parking)
- Looking for proposal to include good bicycle infrastructure and design. Ground floor room, visitor parking etc.
- Should consider increased bike parking to support active transportation development

    - Current reduction in parking requires further analysis and rationale before reduction would be supported. What is the parking strategy and active transit support strategy for this development?
- Encouraged to design building for City direction on waste collection – will send guidelines
- Will let Randolph elaborate further on Urban design concerns.
- The two mature trees at corner of Springhurst should be preserved.

Mark Richardson, Forest

- The City encourages the retention of healthy, structurally sound trees; please seek opportunities for retention of trees that will contribute to the design/function of the site.
- A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
    - an approved TCR is a requirement of Site Plan approval.
- As of January 1 2021, any removal of privately-owned trees 10cm or larger in diameter, or publicly (City) owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
- The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    - If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    - Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
- The TCR must list all trees on site by species, diameter and health condition
- Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
- The TCR must list all trees on adjacent sites if they have a critical root zone that extends onto the development site
- If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
- All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    - the location of tree protection fencing must be shown on a plan
    - show the critical root zone of the retained trees
    - if excavation will occur within the critical root zone, please show the limits of excavation
- For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:
For additional information on the following please contact tracy.smith@Ottawa.ca

- Minimum Setbacks
    - Maintain 1.5m from sidewalk or MUP/cycle track.
    - Maintain 2.5m from curb
    - Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing.
- Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

- Tree specifications
  - Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
  - Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
  - Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
  - Plant native trees whenever possible
  - No root barriers, dead-man anchor systems, or planters are permitted.
  - No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please ensure adequate soil volumes are met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Randolph Wang, Urban Design

- The applicants' efforts of early engagement, the base-middle-top approach to architecture design, as well as the retaining and relocation of the statue are appreciated.
- There are some significant concerns on the overall building massing and site plan (see attached diagrams for reference):
    - The conflict between the proposed building and the existing condo building to the west due to the extreme close proximity of the buildings;
    - The conflict between the proposed building and the existing trees at the north west corner of the site.
    - The extended area of surface parking on Oblats.
- Considerations should be given to developing different massing and site plan options. The attached diagram illustrates one of the possible options where the proposed development and the existing building will form a new H shape building with reasonable setbacks from interior lot line as well as the existing trees.
- The Oblats front should be as "green" as possible. Efforts should be made to minimize and eliminate surface parking.
- A Design Brief is required as part of the submission. The Terms of Reference of the Design Brief is attached for convenience.

Preliminary Comments from Community Association Representative

Phyllis

- We really want to see that the statue is retained, and the history of the sisters shared
- Really don't like parking along Oblats. This is generally discouraged in the area.
- Would like to encourage retention of trees
- Would like to clarify the use of the rooftop
- Highlight high quality landscaping within secondary plan
- Importance of community feeling along the pathway
- Concerned re garbage and intensity of development (number of units)
- Would like to highlight newly built rental
- Would also like to raise wheelchair accessibility and affordability
- Are there full kitchens within the units?
- Is there going to be HVAC
- Expects push-back from the community due to number of units
- Agree with the thought of an "H" and more greenery on corners.

Paul

- Would like to see more landscaping on the east and west of the lot
- Secondary plan targets 1000 units within area and this will drastically increase that
- Would like to see a reduction in the number of units to be more palatable
- Concerned with projections above the height limit re rooftop mechanical room
- Happy to see retention of the heritage building
- Would like mechanical in building and nor projections

Next steps:

- We encourage the applicant to discuss the proposal with the local Councillor and the community association
- We will follow up with meeting minutes and a list of required documents for the submission

RE: 15 Oblats Ave - SWM Requirements

Jhamb, Nishant <nishant.jhamb@ottawa.ca>
To O'Neill, Meaghan
Cc Blanchette, Erin; Jadallah, Ayham; McCaughey, Stephen

Hello Meaghan,

Based on the high level information, the proposed criteria is acceptable.
I will provide further comments if any when you submit the Site plan control application.

Thank you
Nishant

From: O'Neill, Meaghan <Meaghan.ONeill@wsp.com>
Sent: April 13, 2022 2:18 PM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Blanchette, Erin <Erin.Blanchette@wsp.com>; Jadallah, Ayham <Ayham.Jadallah@wsp.com>; McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Subject: RE: 15 Oblats Ave - SWM Requirements

Hi Nishant,

Thank you for your response.

See my responses / additional questions in red below.

Thank you,

Meaghan

Meaghan O'Neill, EIT
Designer, Water Resources
T+ 1 613-690-1151

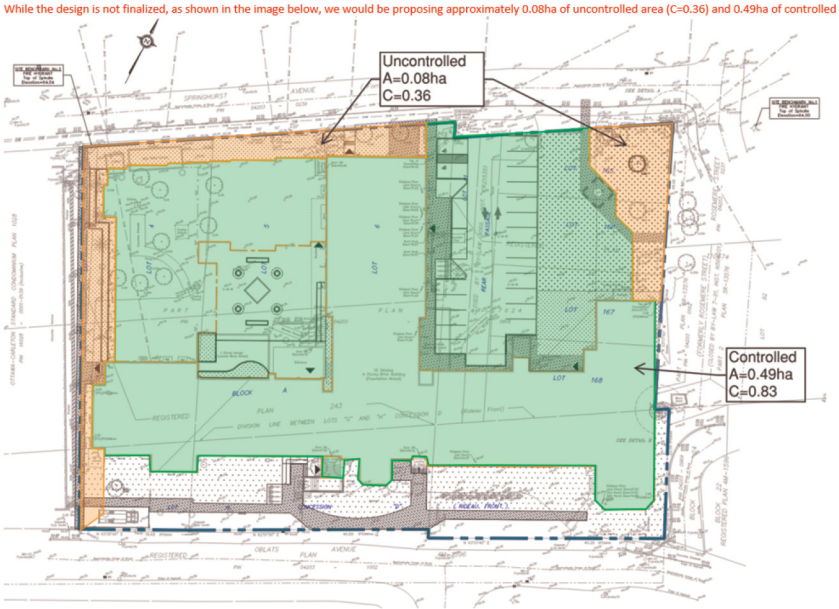
From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Friday, April 8, 2022 10:30 AM
To: O'Neill, Meaghan <Meaghan.ONeill@wsp.com>
Cc: Blanchette, Erin <Erin.Blanchette@wsp.com>; Jadallah, Ayham <Ayham.Jadallah@wsp.com>; McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Subject: RE: 15 Oblats Ave - SWM Requirements

Hello Meaghan, Sorry for the late response

Area in the red can be left uncontrolled and continue to drain towards the ROW.
To clarify, due to some minor changes to landscaping in this area (new path / adjusted parking spaces) there will be a small increase in imperviousness and thus a slight increase in peak flow (Runoff coefficient of 0.52 vs 0.47 in existing conditions). Given the slight increase in runoff in the red area can we assume your previous response to indicate that no SWM control is required for this area?

For the area in the blue, Can you please provide the following info?
What was the 2-year pre development flow (with maximum C=0.5) ?
In existing conditions the area draining to Springhurst Ave (blue area) is an approximately 0.57ha area with a runoff coefficient of 0.74. Thus, using a C=0.5, the 2-yr peak flow is approximately **0.06m3/s** (from HydoCAD).

How much 100-year post development flow(controlled & uncontrolled) are you proposing ?
While the design is not finalized, as shown in the image below, we would be proposing approximately 0.08ha of uncontrolled area (C=0.36) and 0.49ha of controlled area (C=0.83) draining to Spinghurst Ave. The total 100-yr peak flow (including the uncontrolled area) will meet the 2-yr peak flow of 0.06m3/s.



In summary, the existing and proposed peak flows would be approximately as follows:

EXISTING CONDITIONS
Oblats Ave (Red Area):
Area = 0.11 ha
C = 0.47
100-yr flow ~ 0.032m3/s

Springhurst Ave (Blue Area):
Area = 0.57 ha
C = 0.74
2-yr peak flow (C=0.5) ~ 0.06m3/s

PROPOSED CONDITIONS
Oblats Ave (Red Area):
Area = 0.11
C = 0.52
100-yr flow ~ 0.035m3/s

Springhurst Ave (Blue Area):
Area = 0.57 ha
C = 0.77
100-yr peak flow ~ 0.06m3/s

Regards

Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet
Planning, Real Estate and Economic Development Department
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

JN Jhamb, Nishant <nishant.jhamb@ottawa.ca>
To O'Neill, Meaghan
Cc Blanchette, Erin; Jadallah, Ayham; McCaughey, Stephen
You replied to this message on 4/13/2022 2:17 PM.

Hello Meaghan, Sorry for the late response

Area in the red can be left uncontrolled and continue to drain towards the ROW.

For the area in the blue, Can you please provide the following info?
What was the 2-year pre development flow (with maximum C=0.5) ?
How much 100-year post development flow(controlled & uncontrolled) are you proposing ?

Regards

Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet
Planning, Real Estate and Economic Development Department
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

From: O'Neill, Meaghan <Meaghan.ONeill@wsp.com>
Sent: April 06, 2022 11:46 AM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Blanchette, Erin <Erin.Blanchette@wsp.com>; Jadallah, Ayham <Ayham.Jadallah@wsp.com>; McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Subject: 15 Oblats Ave - SWM Requirements

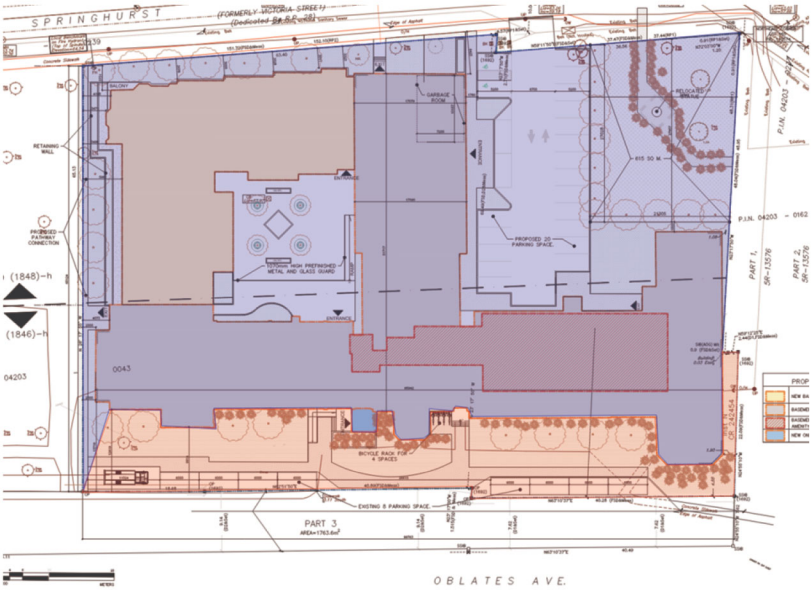
Hi Nishant,

We are in the process of working on the stormwater management design for 15 Oblats Ave and were hoping you could clarify the SWM requirements.

In the pre-consultation meeting notes (minutes attached) it is stated that the SWM requirements is to "control post-development runoff from the subject site, up to and including the 100-year storm event, to a 2-year pre-development level." As shown below, under existing conditions the majority of the site (blue) drains north to the Springhurst Ave sewer, and a small portion of the site (red) drains south to the Oblats sewer. As also shown below, under proposed conditions, existing drainage patterns will be maintained, with the majority of changes made to the area draining to Springhurst Ave (blue) and only minor landscaping changes made on the south side of the building (red).

Existing Drainage Areas:

Proposed Drainage Areas:



Can you clarify if the requirement to controlled to the 2yr pre-development rate is on a sitewide basis? Due to space and grading constraints there would be limited opportunity to capture the area south of the building and no significant changes are being made in this area with all runoff continuing to drain overland to Oblats Ave.

Thank you,

Meaghan

Meaghan O'Neill
Designer, Water Resources
EIT

T+ 1 613-690-1151

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

RE: Stormwater Quality Requirements - 15 Oblats Ave

EL Eric Lalande <eric.lalande@rvca.ca>
To O'Neill, Meaghan

Hi Meaghan,

Based on the proposed addition, the RVCA does not have any additional water quality control requirements, however strongly encourage best management practices be integrated into the design, where feasible.

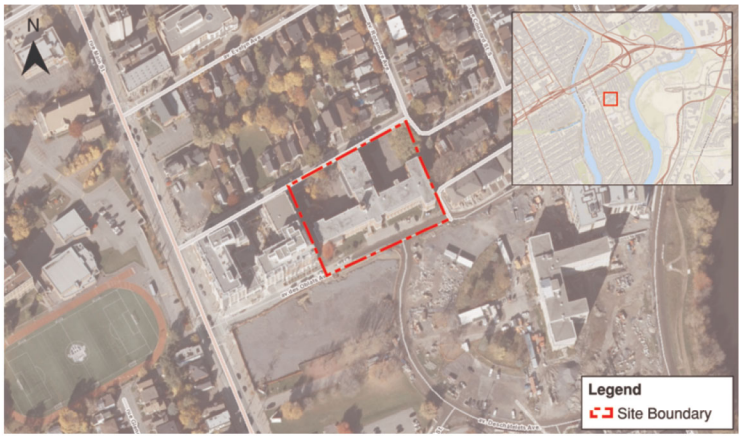
Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: O'Neill, Meaghan <Meaghan.ONeill@wsp.com>
Sent: Wednesday, April 6, 2022 9:02 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>; Glen McDonald <glen.mcdonald@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>; Emma Bennett <emma.bennett@rvca.ca>
Cc: Jadallah, Ayham <Ayham.Jadallah@wsp.com>; Blanchette, Erin <Erin.Blanchette@wsp.com>; McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Subject: Stormwater Quality Requirements - 15 Oblats Ave

Hello,

We are currently working on a development project within the RVCA boundaries located at 15 Oblats Ave, Ottawa, ON. Please see the image below for the project location as well as the proposed site plan attached. As shown on the image below, the approximately 0.68 ha site consists of an existing 4-storey building, parking areas and small landscaped areas. As shown on the site plan, under proposed conditions the existing building will remain and an approximately 848 sq.m addition will be added to the north-west corner.



As per the pre-consultation meeting notes from May 27th, 2021, the City of Ottawa requested we consult with the RVCA regarding the quality control requirements for this site. Can you provide the quality control criteria for this site?

Thank you,

Meaghan

Meaghan O'Neill
Designer, Water Resources
EIT

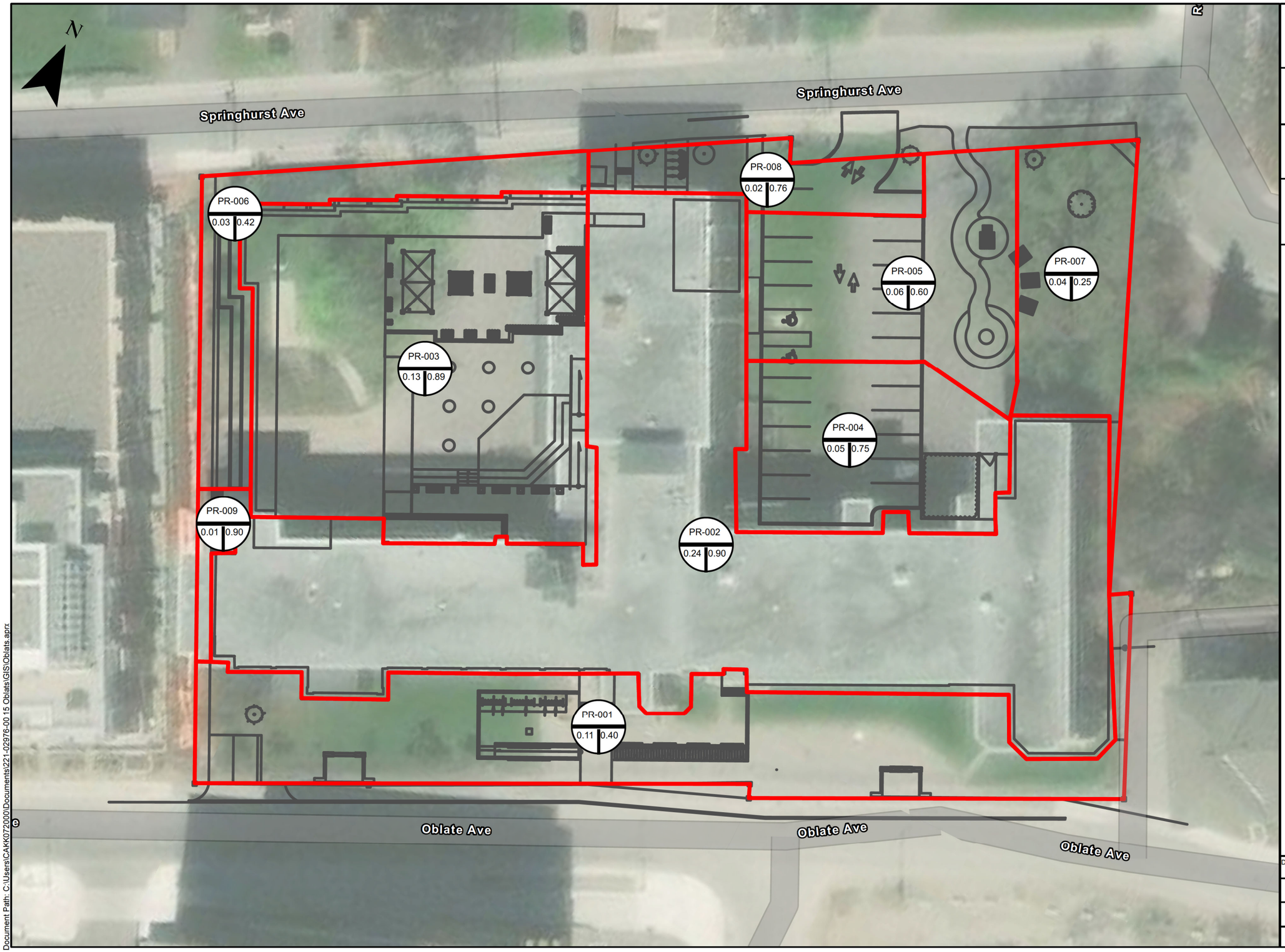
T+ 1 613-690-1151

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

APPENDIX

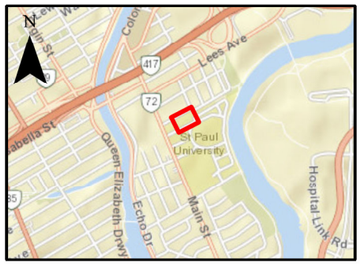
B EXHIBITS



CLIENT
FORUM 15 OBLATS LIMITED PARTNERSHIP

PROJECT
15 OBLATS AVENUE

TITLE
EXHIBIT 1
PROPOSED CONDITIONS DRAINAGE AREA PLAN



LEGEND

Subcatchments

Subcatchment ID
Area (ha) | Runoff C

0 0 0.01 km

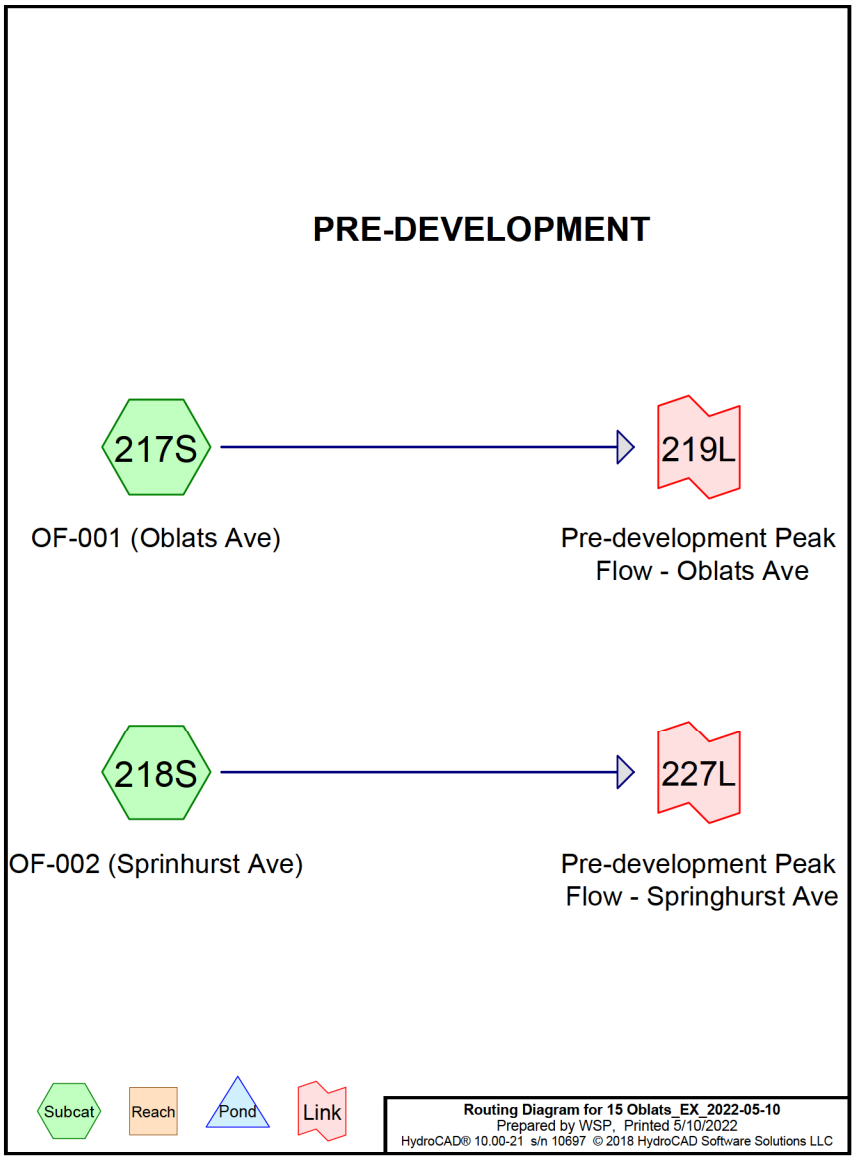
DRAWN BY	CHECKED BY
KK	AS
March 2023	
NAD 1983 MTM 9	
1:400	

wsp

Document Path: C:\Users\CAKK072000\Documents\221-02976-00.15 Oblats\GIS\Oblats.aprx

APPENDIX

C CALCULATIONS & HYDROCAD OUTPUT



Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.47	EX-001 (217S)
5,700.0	0.50	EX-002 (Actual C=0.74) (218S)
6,800.0	**0.50**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 217S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=6 mm
Tc=10.0 min C=0.47 Runoff=0.01084 m³/s 6.6 m³

Subcatchment 218S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=6 mm
Tc=10.0 min C=0.50 Runoff=0.05974 m³/s 36.5 m³

Link 219L: Pre-development Peak Flow - Oblats Ave Inflow=0.01084 m³/s 6.6 m³
Primary=0.01084 m³/s 6.6 m³

Link 227L: Pre-development Peak Flow - Springhurst Ave Inflow=0.05974 m³/s 36.5 m³
Primary=0.05974 m³/s 36.5 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 43.1 m³ Average Runoff Depth = 6 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 217S: OF-001 (Oblats Ave)

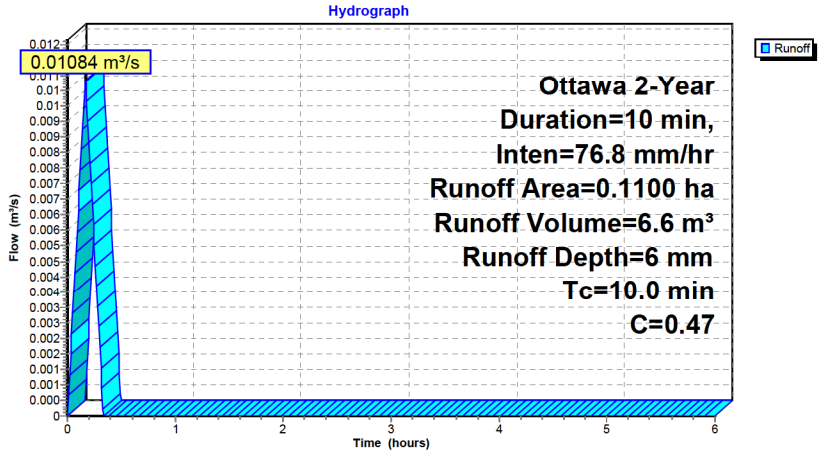
Runoff = 0.01084 m³/s @ 0.17 hrs, Volume= 6.6 m³, Depth= 6 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.1100	0.47	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 217S: OF-001 (Oblats Ave)



Summary for Subcatchment 218S: OF-002 (Sprinhurst Ave)

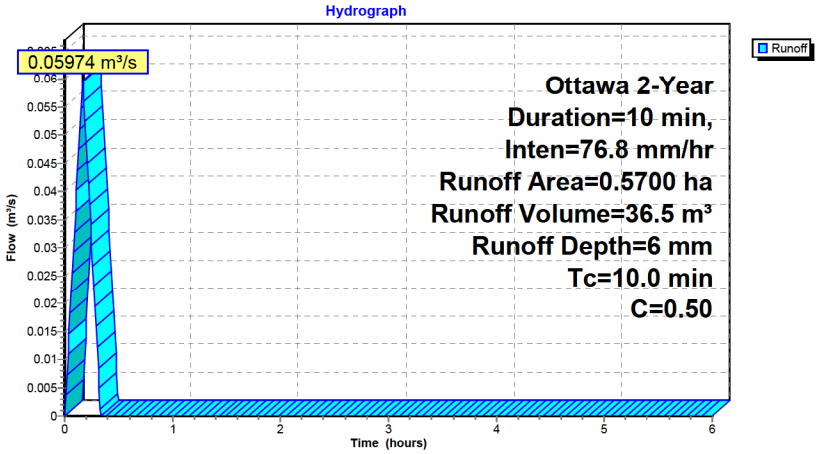
Runoff = 0.05974 m³/s @ 0.17 hrs, Volume= 36.5 m³, Depth= 6 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.5700	0.50	EX-002 (Actual C=0.74)
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 218S: OF-002 (Sprinhurst Ave)

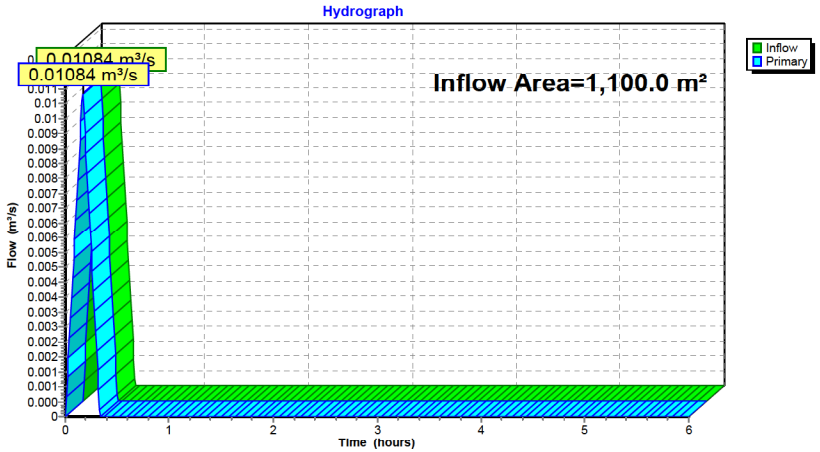


Summary for Link 219L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 6 mm for 2-Year event
Inflow = 0.01084 m³/s @ 0.17 hrs, Volume= 6.6 m³
Primary = 0.01084 m³/s @ 0.17 hrs, Volume= 6.6 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 219L: Pre-development Peak Flow - Oblats Ave

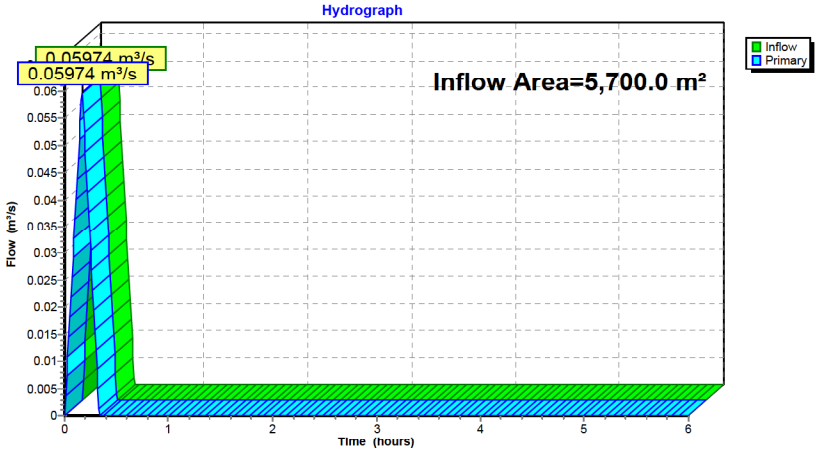


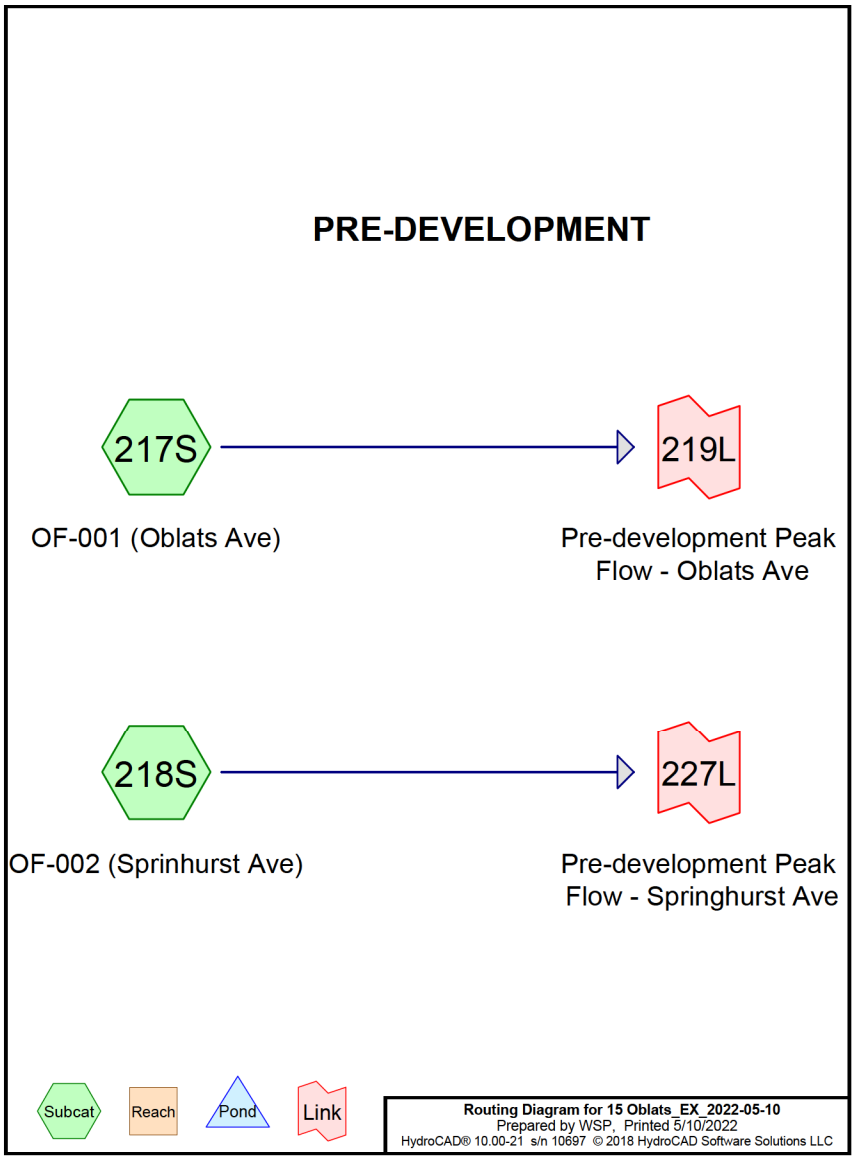
Summary for Link 227L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 6 mm for 2-Year event
Inflow = 0.05974 m³/s @ 0.17 hrs, Volume= 36.5 m³
Primary = 0.05974 m³/s @ 0.17 hrs, Volume= 36.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 227L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.47	EX-001 (217S)
5,700.0	0.50	EX-002 (Actual C=0.74) (218S)
6,800.0	**0.50**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 217S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=8 mm
Tc=10.0 min C=0.47 Runoff=0.01470 m³/s 9.0 m³

Subcatchment 218S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=9 mm
Tc=10.0 min C=0.50 Runoff=0.08104 m³/s 49.5 m³

Link 219L: Pre-development Peak Flow - Oblats Ave Inflow=0.01470 m³/s 9.0 m³
Primary=0.01470 m³/s 9.0 m³

Link 227L: Pre-development Peak Flow - Springhurst Ave Inflow=0.08104 m³/s 49.5 m³
Primary=0.08104 m³/s 49.5 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 58.4 m³ Average Runoff Depth = 9 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 217S: OF-001 (Oblats Ave)

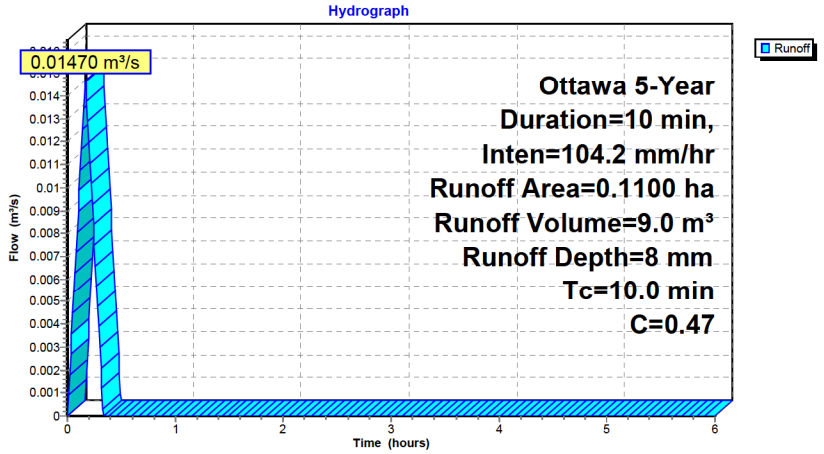
Runoff = 0.01470 m³/s @ 0.17 hrs, Volume= 9.0 m³, Depth= 8 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.1100	0.47	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 217S: OF-001 (Oblats Ave)



Summary for Subcatchment 218S: OF-002 (Sprinhurst Ave)

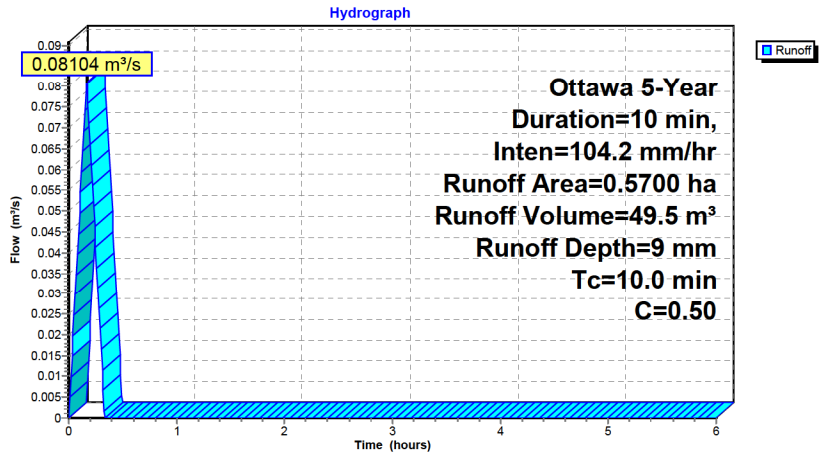
Runoff = 0.08104 m³/s @ 0.17 hrs, Volume= 49.5 m³, Depth= 9 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.5700	0.50	EX-002 (Actual C=0.74)
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 218S: OF-002 (Sprinhurst Ave)

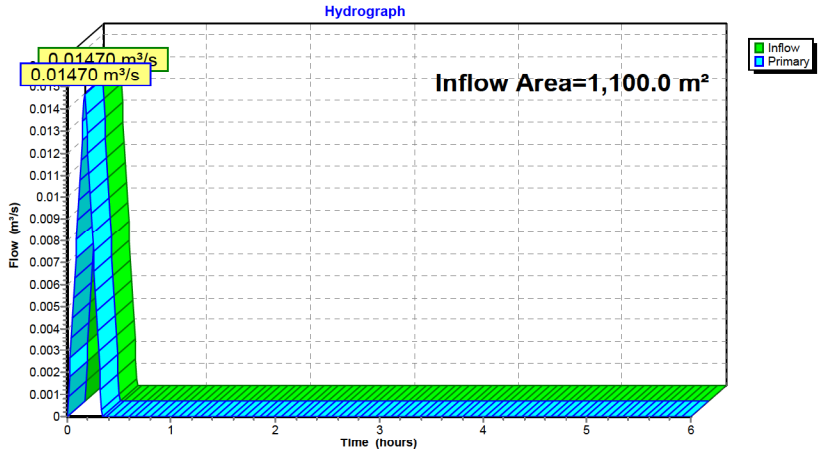


Summary for Link 219L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 8 mm for 5-Year event
Inflow = 0.01470 m³/s @ 0.17 hrs, Volume= 9.0 m³
Primary = 0.01470 m³/s @ 0.17 hrs, Volume= 9.0 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 219L: Pre-development Peak Flow - Oblats Ave

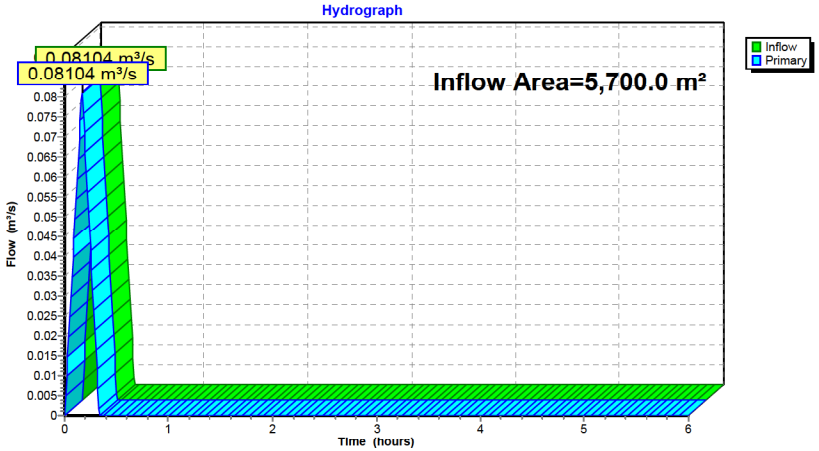


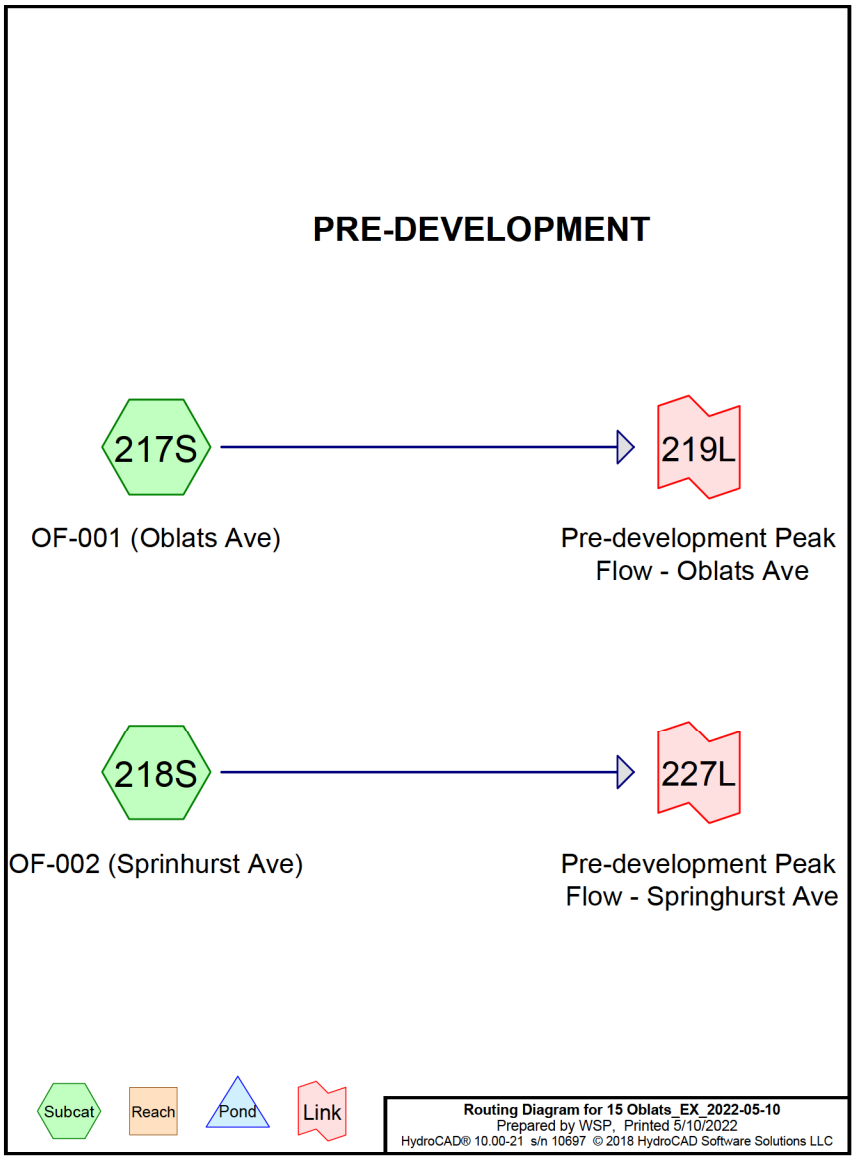
Summary for Link 227L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 9 mm for 5-Year event
Inflow = 0.08104 m³/s @ 0.17 hrs, Volume= 49.5 m³
Primary = 0.08104 m³/s @ 0.17 hrs, Volume= 49.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 227L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.47	EX-001 (217S)
5,700.0	0.50	EX-002 (Actual C=0.74) (218S)
6,800.0	**0.50**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 217S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=10 mm
Tc=10.0 min C=0.47 Runoff=0.01723 m³/s 10.5 m³

Subcatchment 218S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=10 mm
Tc=10.0 min C=0.50 Runoff=0.09500 m³/s 58.0 m³

Link 219L: Pre-development Peak Flow - Oblats Ave Inflow=0.01723 m³/s 10.5 m³
Primary=0.01723 m³/s 10.5 m³

Link 227L: Pre-development Peak Flow - Springhurst Ave Inflow=0.09500 m³/s 58.0 m³
Primary=0.09500 m³/s 58.0 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 68.5 m³ Average Runoff Depth = 10 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 217S: OF-001 (Oblats Ave)

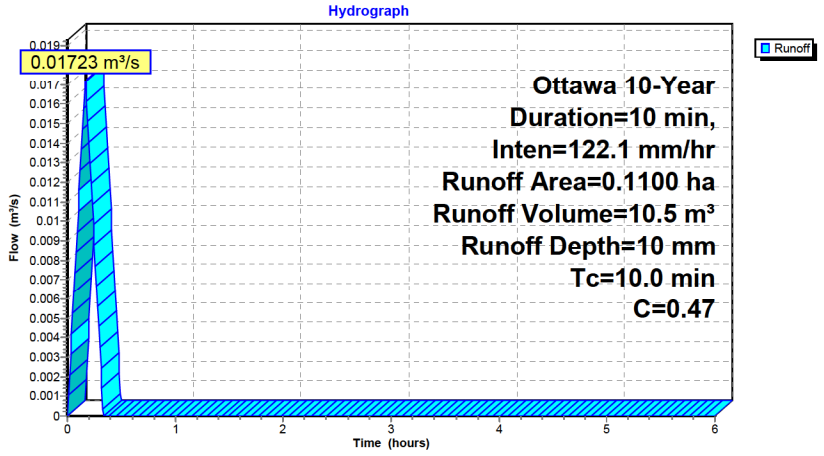
Runoff = 0.01723 m³/s @ 0.17 hrs, Volume= 10.5 m³, Depth= 10 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.1100	0.47	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 217S: OF-001 (Oblats Ave)



Summary for Subcatchment 218S: OF-002 (Sprinhurst Ave)

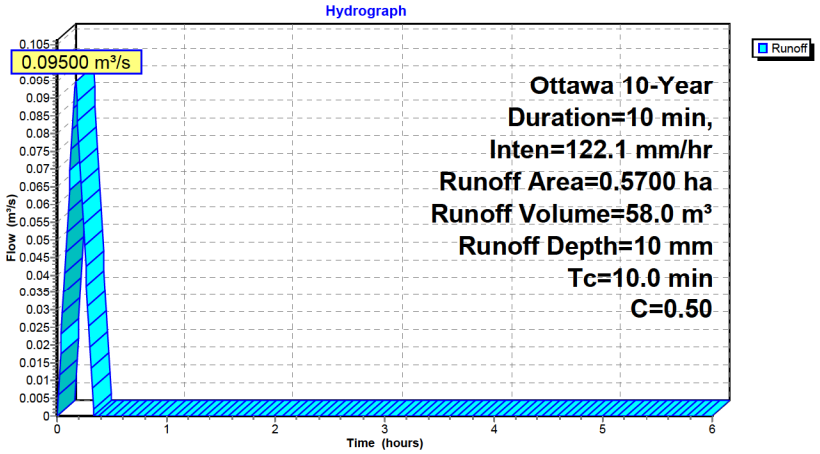
Runoff = 0.09500 m³/s @ 0.17 hrs, Volume= 58.0 m³, Depth= 10 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.5700	0.50	EX-002 (Actual C=0.74)
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 218S: OF-002 (Sprinhurst Ave)

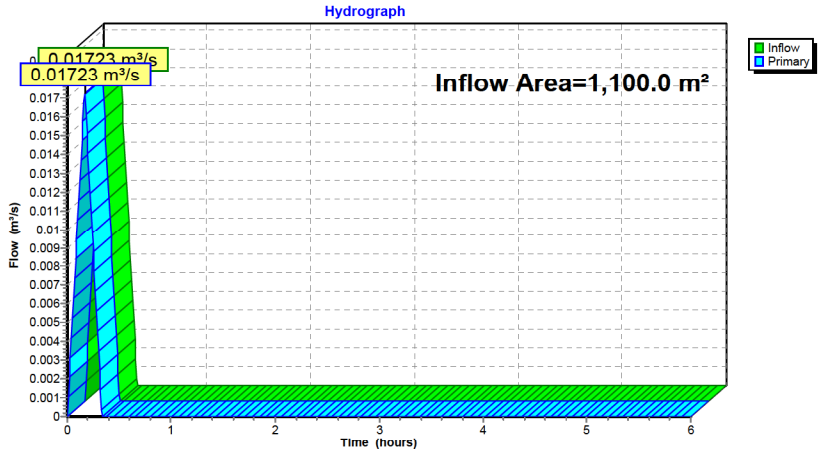


Summary for Link 219L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 10 mm for 10-Year event
Inflow = 0.01723 m³/s @ 0.17 hrs, Volume= 10.5 m³
Primary = 0.01723 m³/s @ 0.17 hrs, Volume= 10.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 219L: Pre-development Peak Flow - Oblats Ave

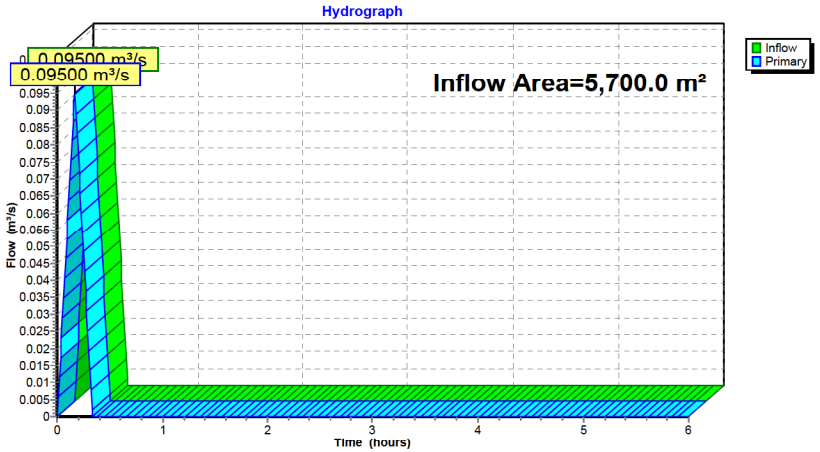


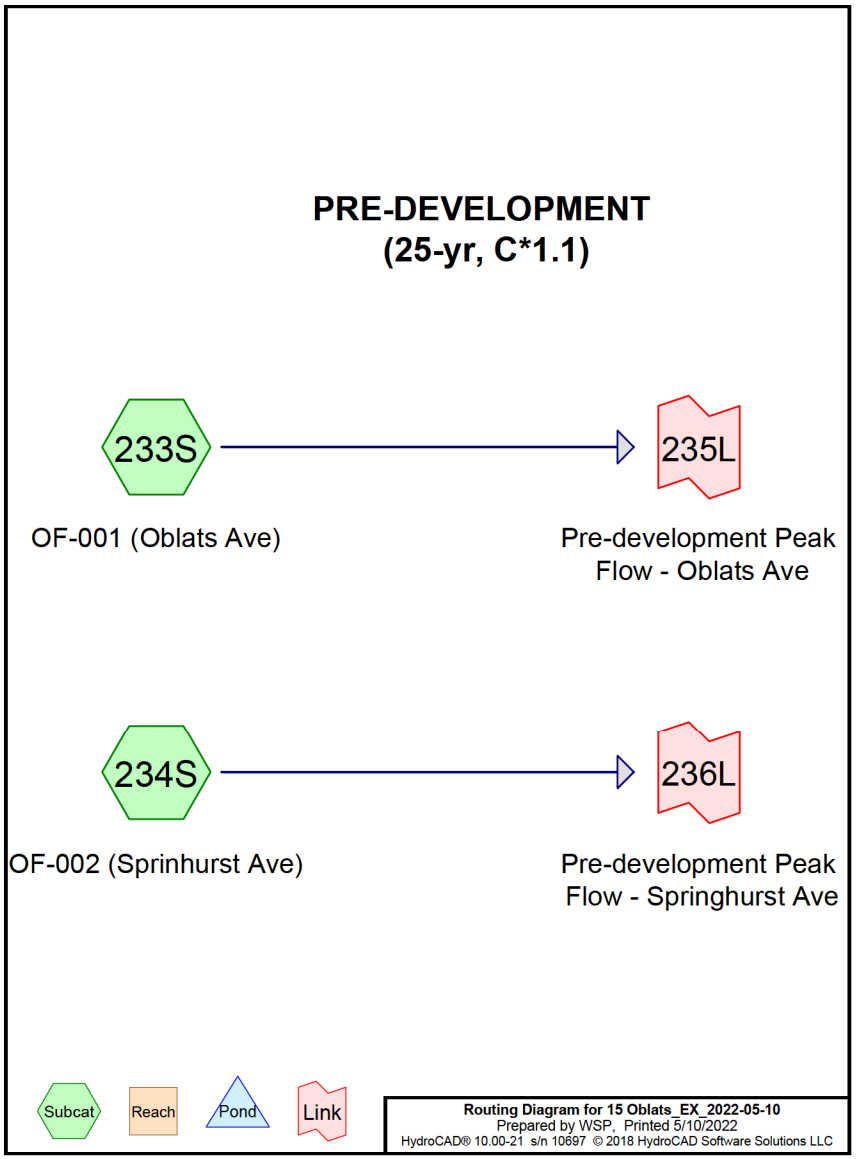
Summary for Link 227L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 10 mm for 10-Year event
Inflow = 0.09500 m³/s @ 0.17 hrs, Volume= 58.0 m³
Primary = 0.09500 m³/s @ 0.17 hrs, Volume= 58.0 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 227L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.52	EX-001 (233S)
5,700.0	0.55	EX-002 (234S)
6,800.0	**0.55**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 233S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.52 Runoff=0.02259 m³/s 13.8 m³

Subcatchment 234S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.55 Runoff=0.12380 m³/s 75.6 m³

Link 235L: Pre-development Peak Flow - Oblats Ave Inflow=0.02259 m³/s 13.8 m³
Primary=0.02259 m³/s 13.8 m³

Link 236L: Pre-development Peak Flow - Springhurst Ave Inflow=0.12380 m³/s 75.6 m³
Primary=0.12380 m³/s 75.6 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 89.4 m³ Average Runoff Depth = 13 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 233S: OF-001 (Oblats Ave)

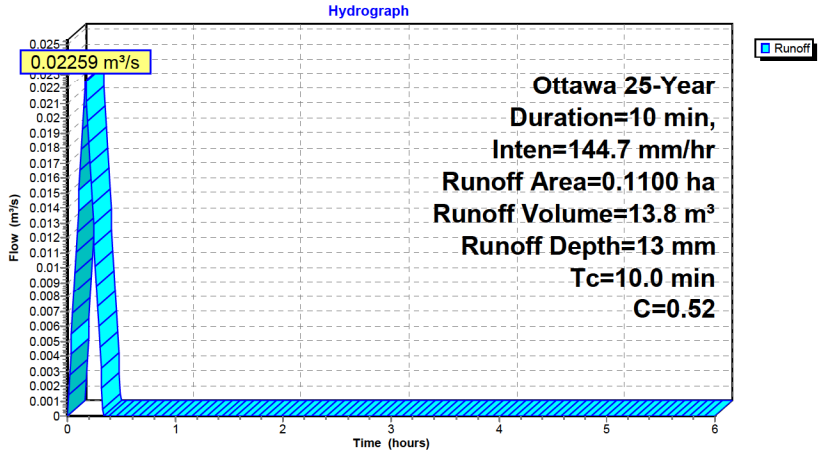
Runoff = 0.02259 m³/s @ 0.17 hrs, Volume= 13.8 m³, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.1100	0.52	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 233S: OF-001 (Oblats Ave)



Summary for Subcatchment 234S: OF-002 (Sprinhurst Ave)

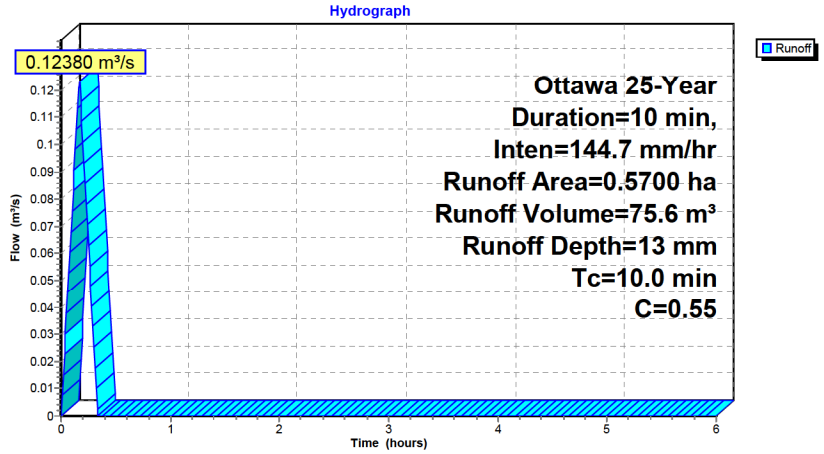
Runoff = 0.12380 m³/s @ 0.17 hrs, Volume= 75.6 m³, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.5700	0.55	EX-002
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 234S: OF-002 (Sprinhurst Ave)

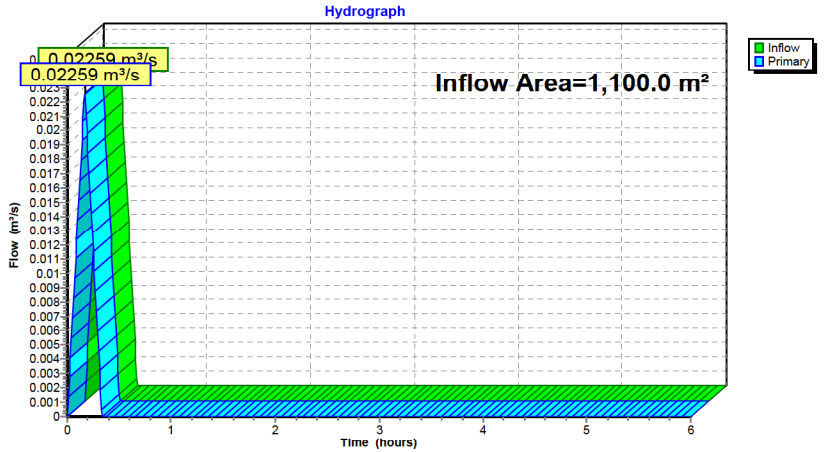


Summary for Link 235L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 13 mm for 25-Year event
Inflow = 0.02259 m³/s @ 0.17 hrs, Volume= 13.8 m³
Primary = 0.02259 m³/s @ 0.17 hrs, Volume= 13.8 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 235L: Pre-development Peak Flow - Oblats Ave

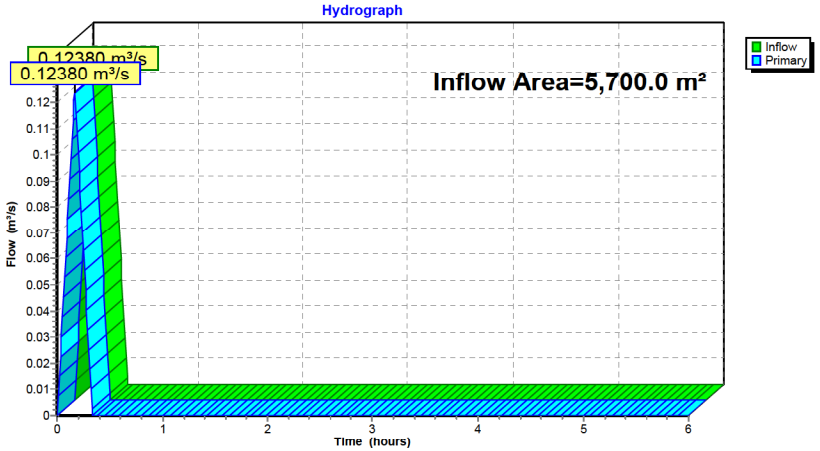


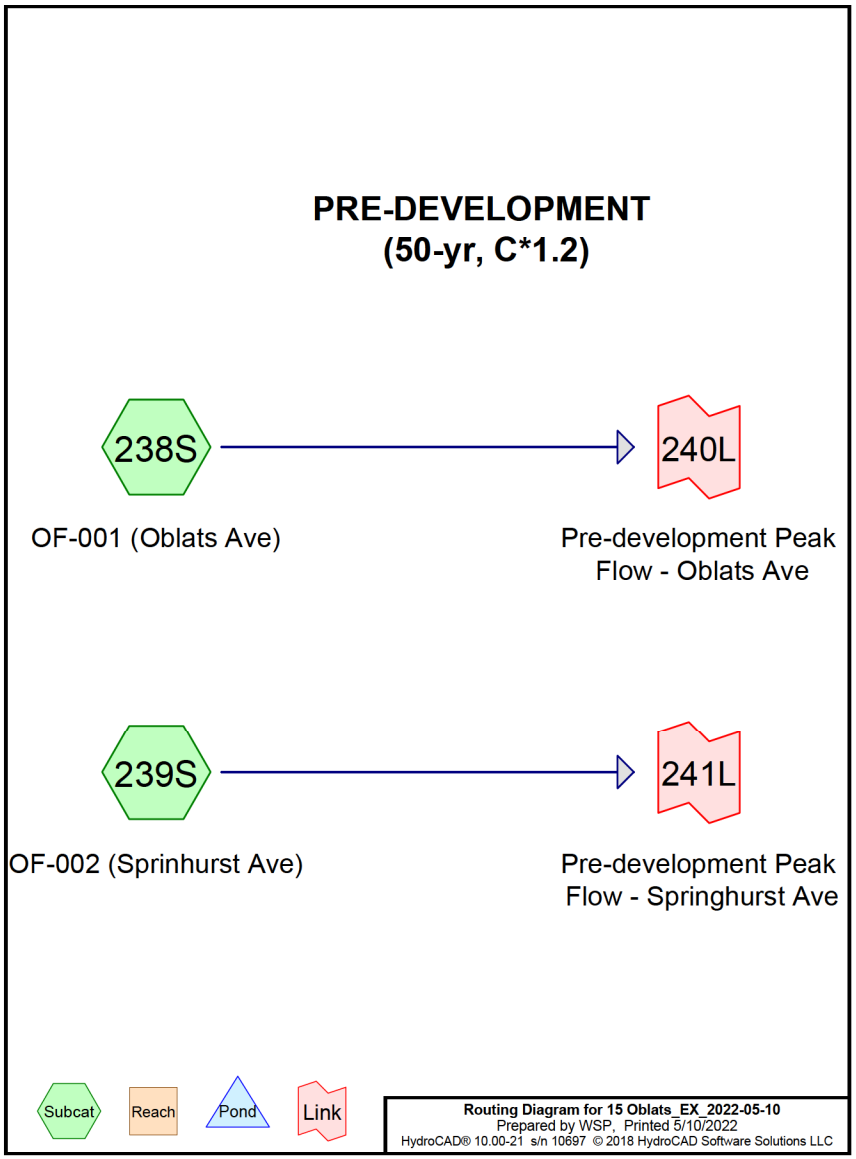
Summary for Link 236L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 13 mm for 25-Year event
Inflow = 0.12380 m³/s @ 0.17 hrs, Volume= 75.6 m³
Primary = 0.12380 m³/s @ 0.17 hrs, Volume= 75.6 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 236L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.56	EX-001 (238S)
5,700.0	0.60	EX-002 (239S)
6,800.0	**0.59**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 238S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=15 mm
Tc=10.0 min C=0.56 Runoff=0.02715 m³/s 16.6 m³

Subcatchment 239S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=16 mm
Tc=10.0 min C=0.60 Runoff=0.15071 m³/s 92.0 m³

Link 240L: Pre-development Peak Flow - Oblats Ave Inflow=0.02715 m³/s 16.6 m³
Primary=0.02715 m³/s 16.6 m³

Link 241L: Pre-development Peak Flow - Springhurst Ave Inflow=0.15071 m³/s 92.0 m³
Primary=0.15071 m³/s 92.0 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 108.6 m³ Average Runoff Depth = 16 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 238S: OF-001 (Oblats Ave)

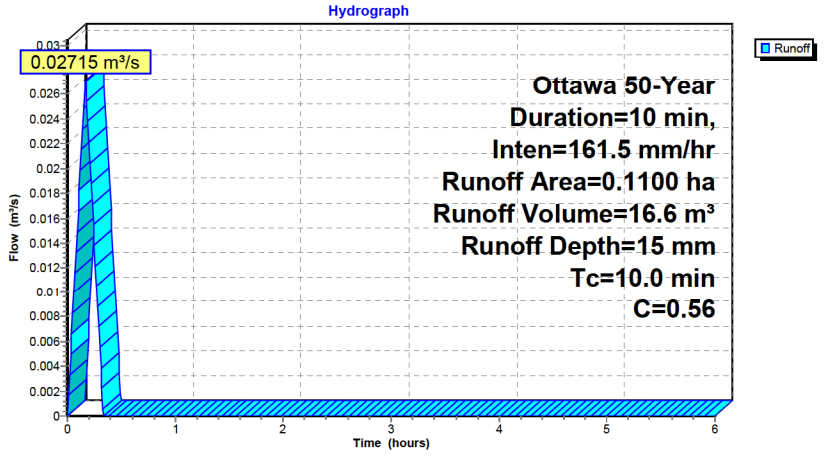
Runoff = 0.02715 m³/s @ 0.17 hrs, Volume= 16.6 m³, Depth= 15 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.1100	0.56	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 238S: OF-001 (Oblats Ave)



Summary for Subcatchment 239S: OF-002 (Sprinhurst Ave)

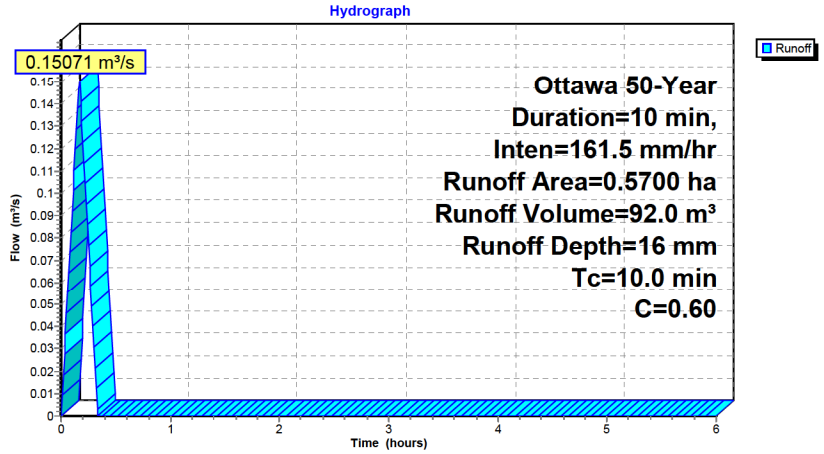
Runoff = 0.15071 m³/s @ 0.17 hrs, Volume= 92.0 m³, Depth= 16 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.5700	0.60	EX-002
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 239S: OF-002 (Sprinhurst Ave)

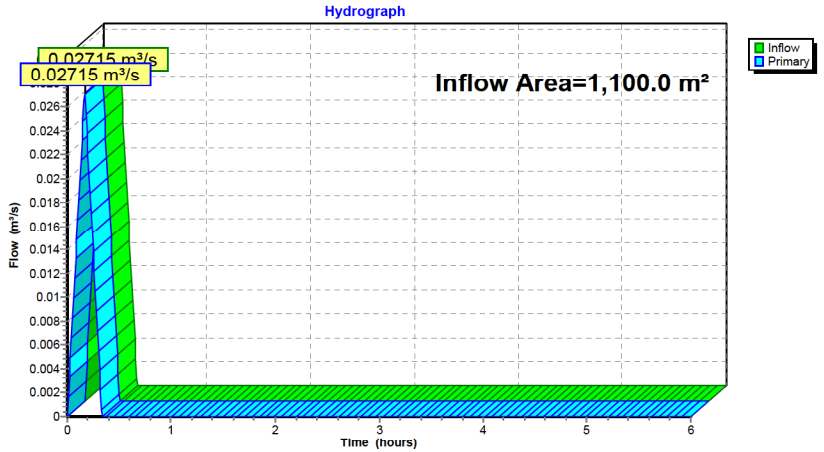


Summary for Link 240L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 15 mm for 50-Year event
Inflow = 0.02715 m³/s @ 0.17 hrs, Volume= 16.6 m³
Primary = 0.02715 m³/s @ 0.17 hrs, Volume= 16.6 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 240L: Pre-development Peak Flow - Oblats Ave

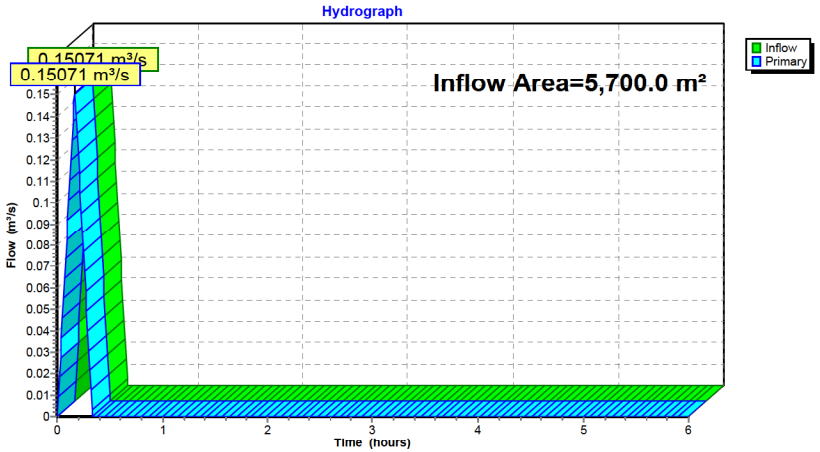


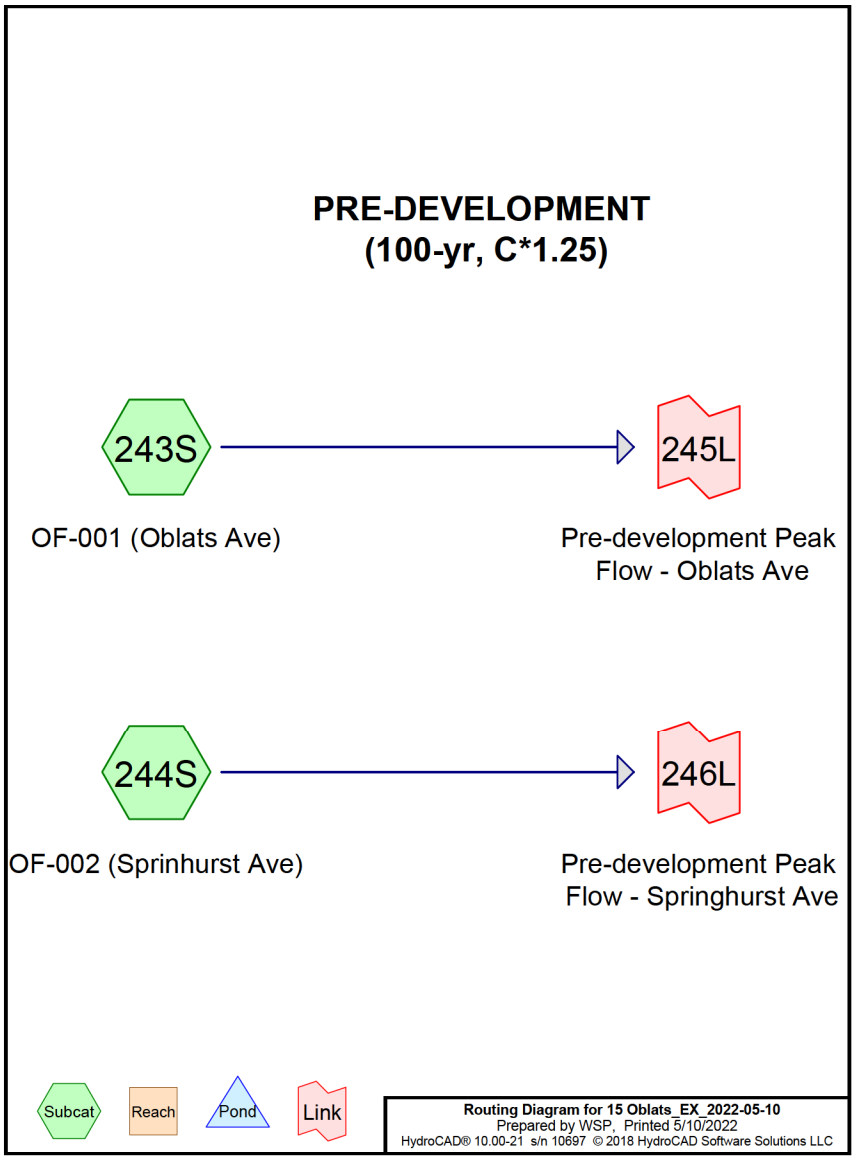
Summary for Link 241L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 16 mm for 50-Year event
Inflow = 0.15071 m³/s @ 0.17 hrs, Volume= 92.0 m³
Primary = 0.15071 m³/s @ 0.17 hrs, Volume= 92.0 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 241L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,100.0	0.59	EX-001 (243S)
5,700.0	0.63	EX-002 (244S)
6,800.0	**0.62**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 243S: OF-001 (Oblats Ave) Runoff Area=0.1100 ha 0.00% Impervious Runoff Depth=18 mm
Tc=10.0 min C=0.59 Runoff=0.03163 m³/s 19.3 m³

Subcatchment 244S: OF-002 (Sprinhurst Runoff Area=0.5700 ha 0.00% Impervious Runoff Depth=19 mm
Tc=10.0 min C=0.63 Runoff=0.17500 m³/s 106.8 m³

Link 245L: Pre-development Peak Flow - Oblats Ave Inflow=0.03163 m³/s 19.3 m³
Primary=0.03163 m³/s 19.3 m³

Link 246L: Pre-development Peak Flow - Springhurst Ave Inflow=0.17500 m³/s 106.8 m³
Primary=0.17500 m³/s 106.8 m³

Total Runoff Area = 6,800.0 m² Runoff Volume = 126.1 m³ Average Runoff Depth = 19 mm
100.00% Pervious = 6,800.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 243S: OF-001 (Oblats Ave)

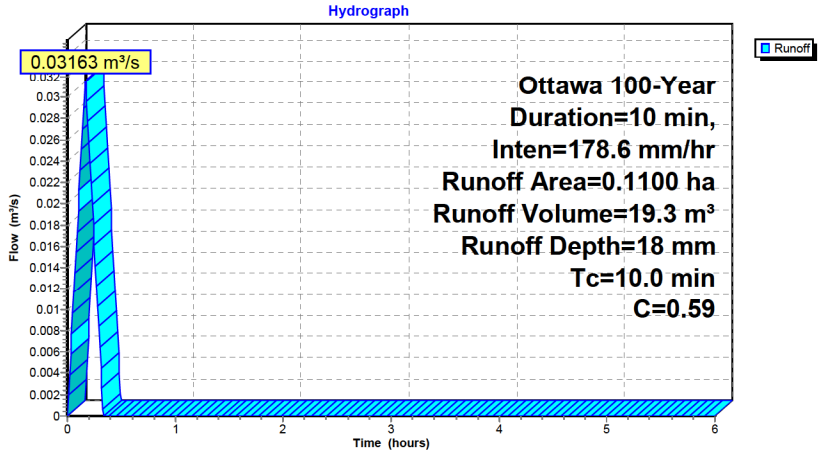
Runoff = 0.03163 m³/s @ 0.17 hrs, Volume= 19.3 m³, Depth= 18 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.1100	0.59	EX-001
0.1100		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 243S: OF-001 (Oblats Ave)



Summary for Subcatchment 244S: OF-002 (Sprinhurst Ave)

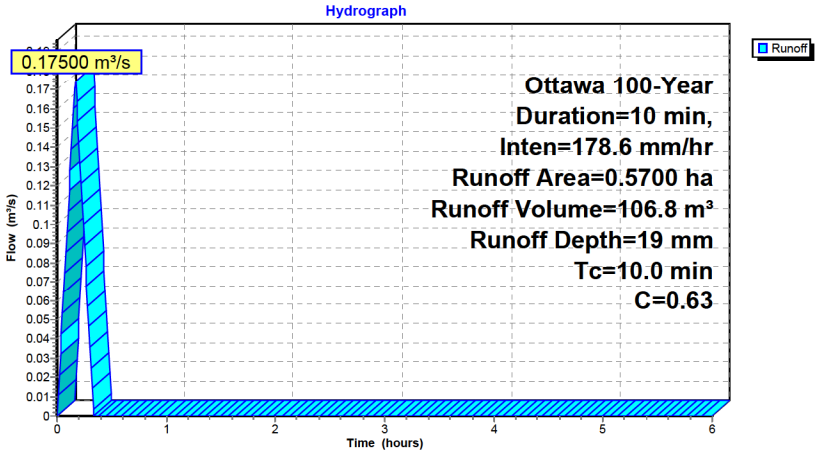
Runoff = 0.17500 m³/s @ 0.17 hrs, Volume= 106.8 m³, Depth= 19 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.5700	0.63	EX-002
0.5700		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					Direct Entry,

Subcatchment 244S: OF-002 (Sprinhurst Ave)

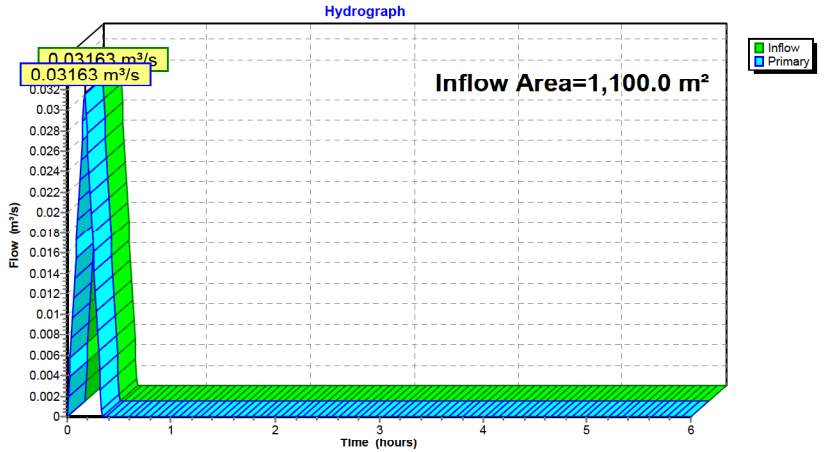


Summary for Link 245L: Pre-development Peak Flow - Oblats Ave

Inflow Area = 1,100.0 m², 0.00% Impervious, Inflow Depth = 18 mm for 100-Year event
Inflow = 0.03163 m³/s @ 0.17 hrs, Volume= 19.3 m³
Primary = 0.03163 m³/s @ 0.17 hrs, Volume= 19.3 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 245L: Pre-development Peak Flow - Oblats Ave

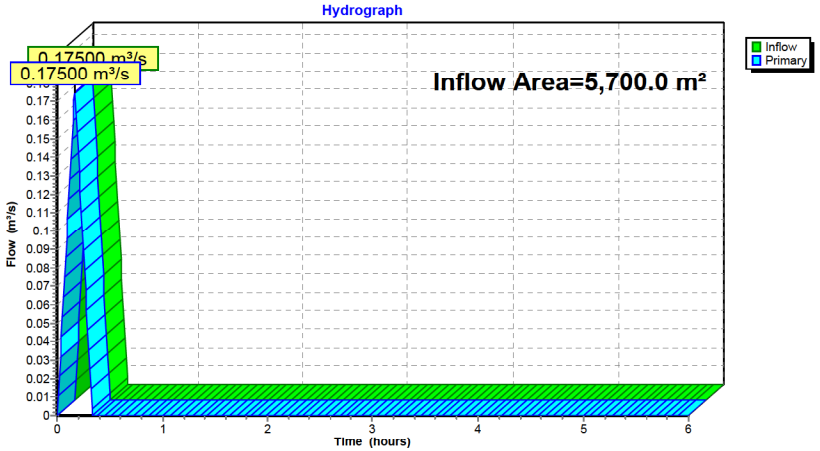


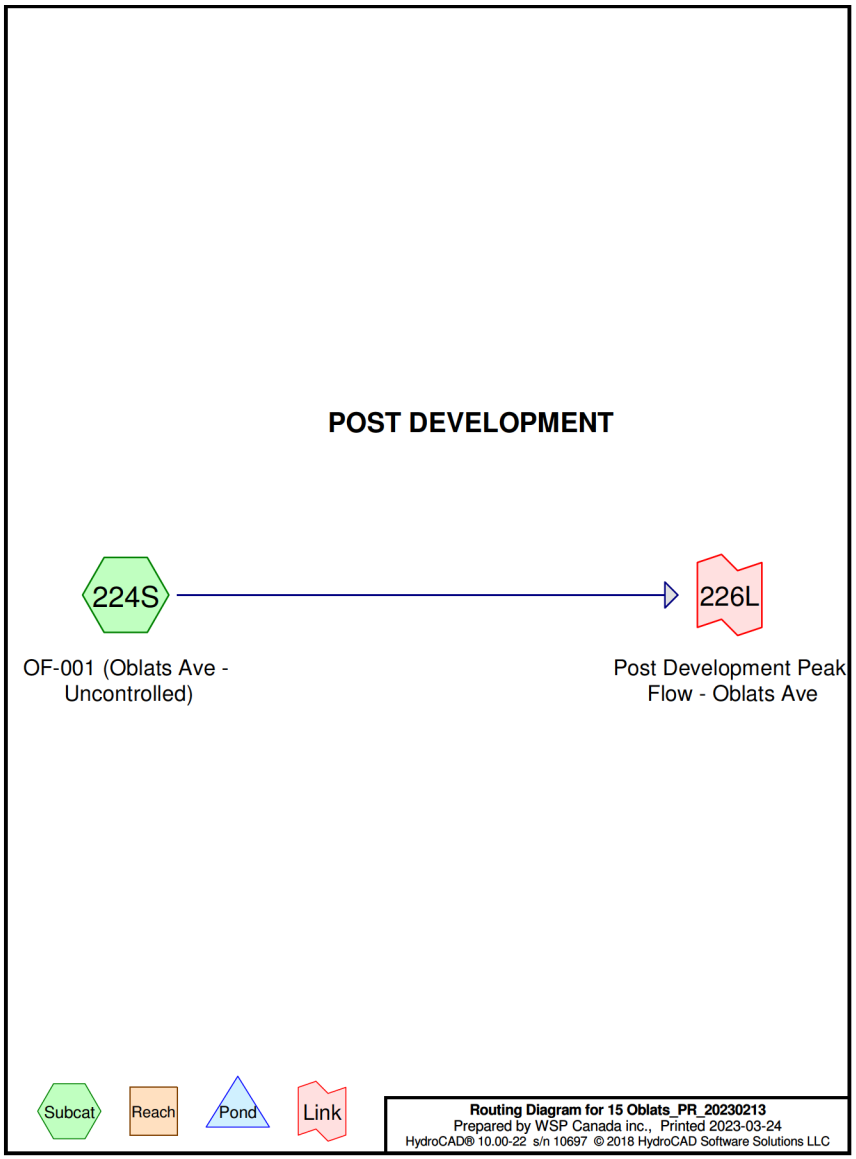
Summary for Link 246L: Pre-development Peak Flow - Springhurst Ave

Inflow Area = 5,700.0 m², 0.00% Impervious, Inflow Depth = 19 mm for 100-Year event
Inflow = 0.17500 m³/s @ 0.17 hrs, Volume= 106.8 m³
Primary = 0.17500 m³/s @ 0.17 hrs, Volume= 106.8 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 246L: Pre-development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.40	PR-001 (224S)
1,062.0	**0.40**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 224S: OF-001 (Oblats Ave - Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=5 mm
Tc=10.0 min C=0.40 Runoff=0.00890 m³/s 5.4 m³

Link 226L: Post Development Peak Flow - Oblats Ave Inflow=0.00890 m³/s 5.4 m³
Primary=0.00890 m³/s 5.4 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 5.4 m³ Average Runoff Depth = 5 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

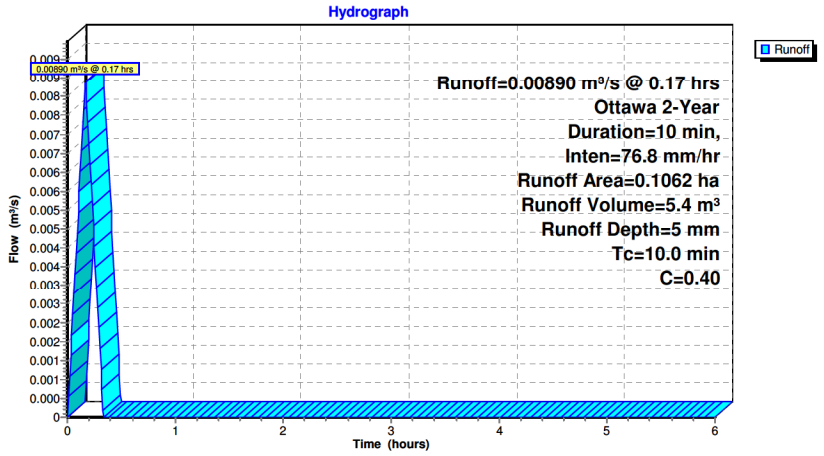
Runoff = 0.00890 m³/s @ 0.17 hrs, Volume= 5.4 m³, Depth= 5 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 2-Year Duration=10 min, Inten=76.8 mm/hr

Area (ha)	C	Description
0.1062	0.40	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

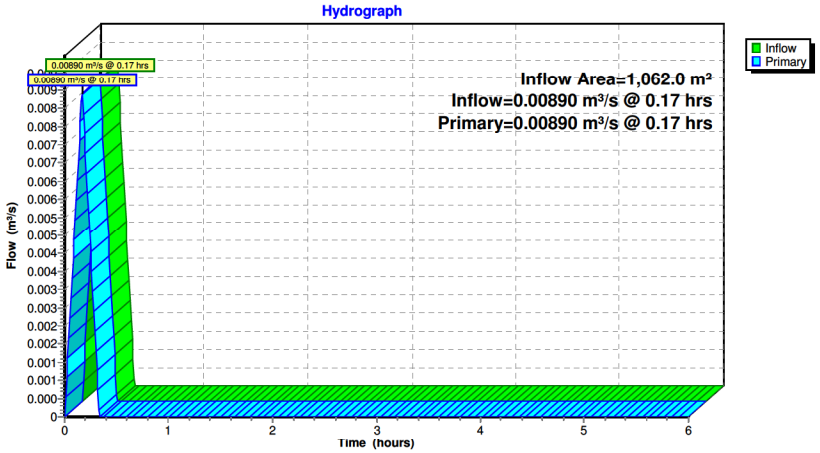


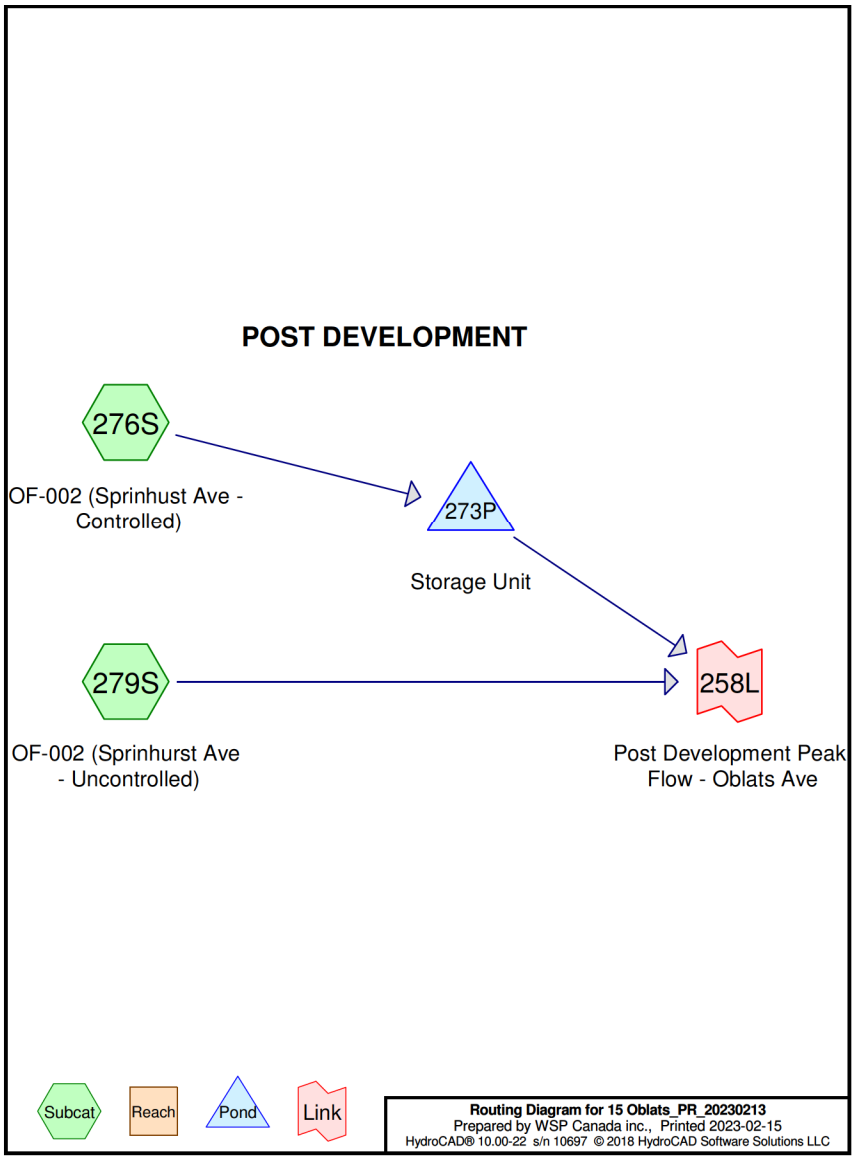
Summary for Link 226L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 5 mm for 2-Year event
Inflow = 0.00890 m³/s @ 0.17 hrs, Volume= 5.4 m³
Primary = 0.00890 m³/s @ 0.17 hrs, Volume= 5.4 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 226L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	0.90	PR-002 (276S)
1,322.0	0.89	PR-003 (276S)
490.0	0.75	PR-004 (276S)
559.0	0.60	PR-005 (276S)
314.0	0.42	PR-006 (276S)
365.0	0.25	PR-007 (279S)
209.0	0.76	PR-008 (279S)
51.0	0.90	PR-009 (279S)
5,710.0	**0.78**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 276S: OF-002 (Sprinhust Runoff Area=0.5085 ha 0.00% Impervious Runoff Depth=20 mm
Tc=10.0 min C=0.82 Runoff=0.02953 m³/s 101.0 m³

Subcatchment 279S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 0.00% Impervious Runoff Depth=11 mm
Tc=10.0 min C=0.47 Runoff=0.00208 m³/s 7.1 m³

Pond 273P: Storage Unit Peak Elev=61.247 m Storage=75.2 m³ Inflow=0.02953 m³/s 101.0 m³
Outflow=0.01851 m³/s 78.8 m³

Link 258L: Post Development Peak Flow - Oblats Ave Inflow=0.02000 m³/s 85.9 m³
Primary=0.02000 m³/s 85.9 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 108.1 m³ Average Runoff Depth = 19 mm
100.00% Pervious = 5,710.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)

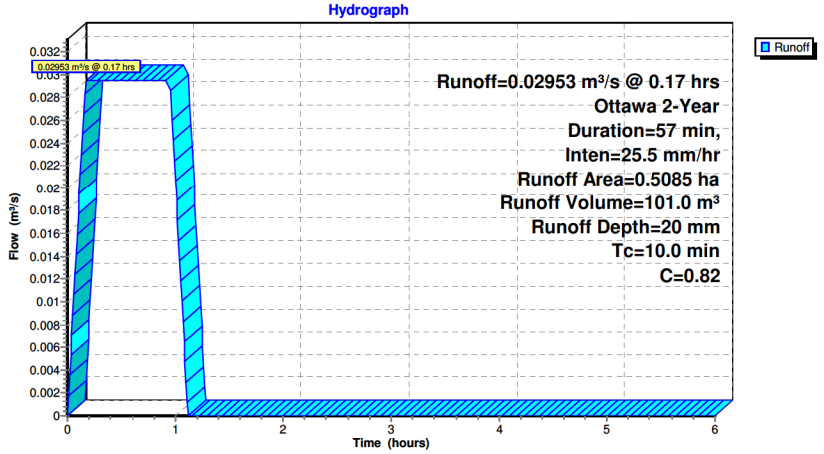
Runoff = 0.02953 m³/s @ 0.17 hrs, Volume= 101.0 m³, Depth= 20 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 2-Year Duration=57 min, Inten=25.5 mm/hr

Area (ha)	C	Description
0.2400	0.90	PR-002
0.1322	0.89	PR-003
0.0490	0.75	PR-004
0.0559	0.60	PR-005
0.0314	0.42	PR-006
0.5085	0.82	Weighted Average
0.5085		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)

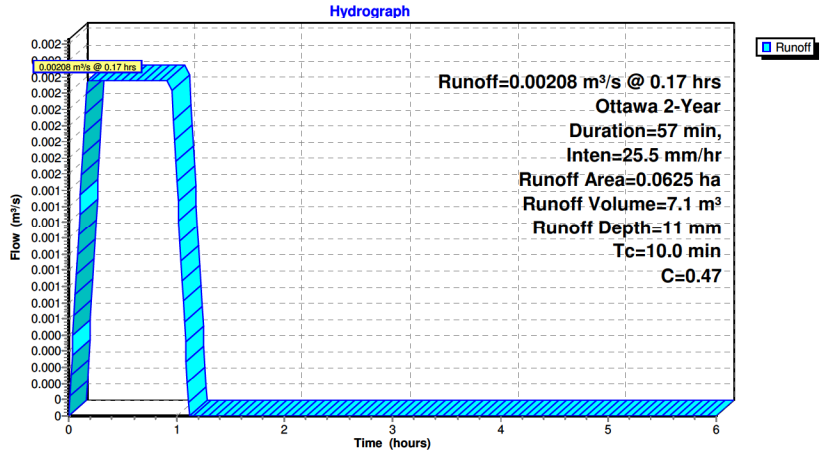
Runoff = 0.00208 m³/s @ 0.17 hrs, Volume= 7.1 m³, Depth= 11 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 2-Year Duration=57 min, Inten=25.5 mm/hr

Area (ha)	C	Description
0.0365	0.25	PR-007
0.0209	0.76	PR-008
0.0051	0.90	PR-009
0.0625	0.47	Weighted Average
0.0625		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 273P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 0.00% Impervious, Inflow Depth = 20 mm for 2-Year event
Inflow = 0.02953 m³/s @ 0.17 hrs, Volume= 101.0 m³
Outflow = 0.01851 m³/s @ 1.01 hrs, Volume= 78.8 m³, Atten= 37%, Lag= 50.5 min
Primary = 0.01851 m³/s @ 1.01 hrs, Volume= 78.8 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 61.247 m @ 1.01 hrs Surf.Area= 0.0 m² Storage= 75.2 m³

Plug-Flow detention time= 79.8 min calculated for 78.8 m³ (78% of inflow)
Center-of-Mass det. time= 73.5 min (107.0 - 33.5)

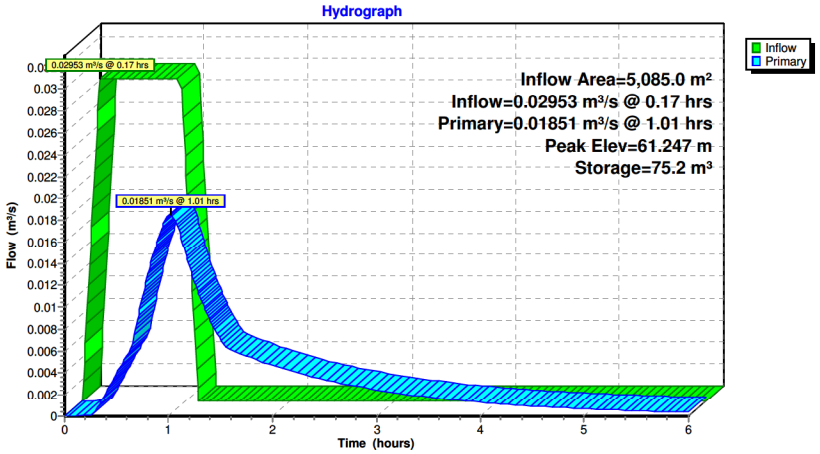
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.01850 m³/s @ 1.01 hrs HW=61.247 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.01850 m³/s)

Pond 273P: Storage Unit

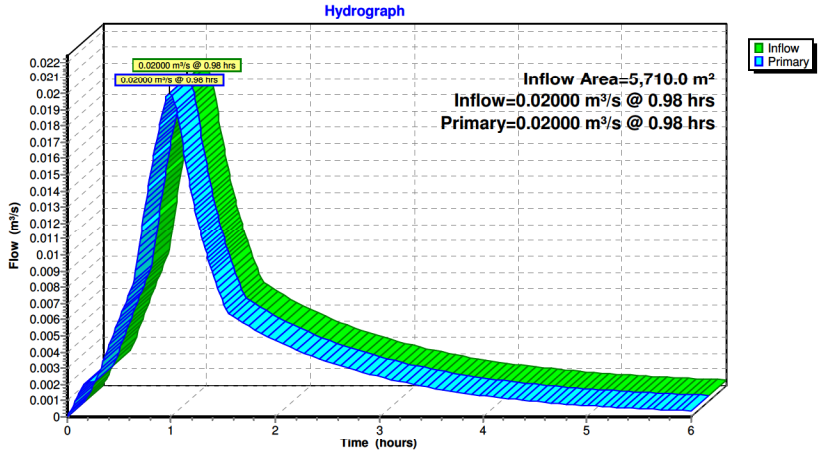


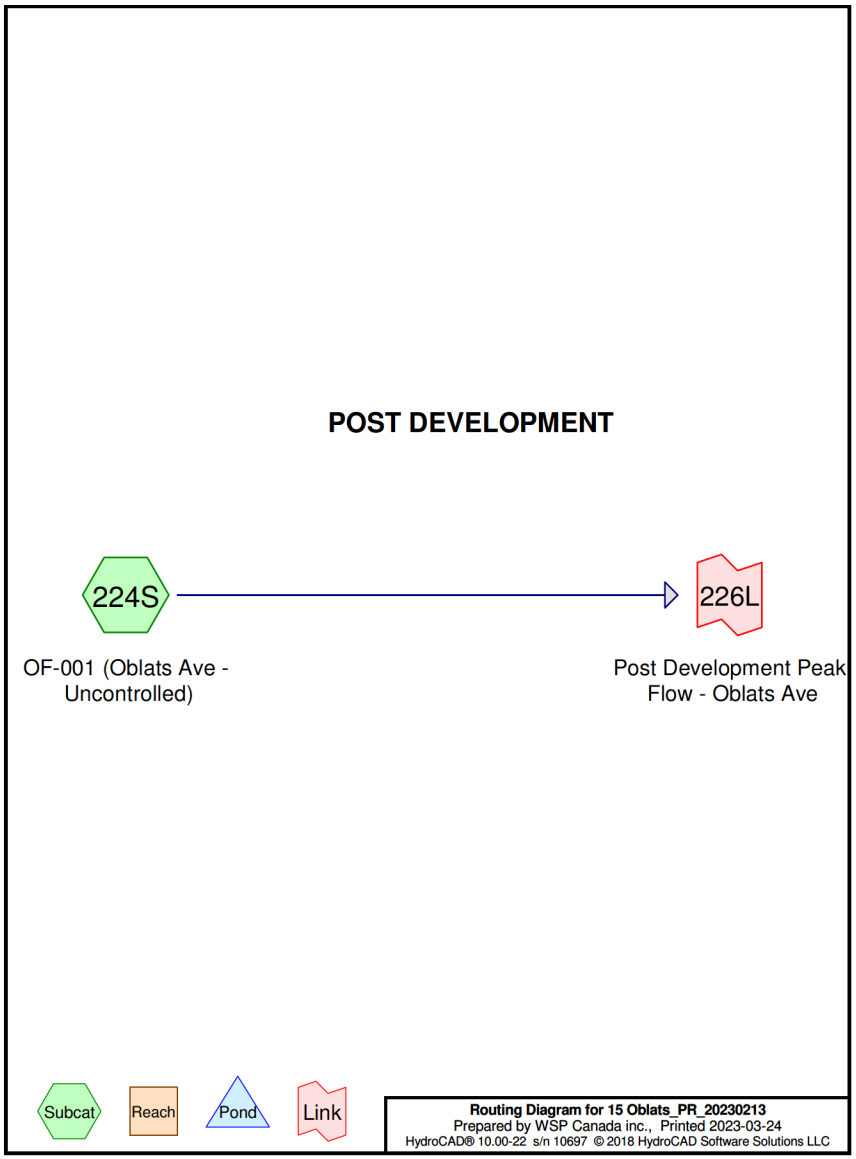
Summary for Link 258L: Post Development Peak Flow - Oblats Ave

Inflow Area = 5,710.0 m², 0.00% Impervious, Inflow Depth > 15 mm for 2-Year event
Inflow = 0.02000 m³/s @ 0.98 hrs, Volume= 85.9 m³
Primary = 0.02000 m³/s @ 0.98 hrs, Volume= 85.9 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 258L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.40	PR-001 (224S)
1,062.0	**0.40**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 224S: OF-001 (Oblats Ave - Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=7 mm
Tc=10.0 min C=0.40 Runoff=0.01208 m³/s 7.4 m³

Link 226L: Post Development Peak Flow - Oblats Ave Inflow=0.01208 m³/s 7.4 m³
Primary=0.01208 m³/s 7.4 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 7.4 m³ Average Runoff Depth = 7 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

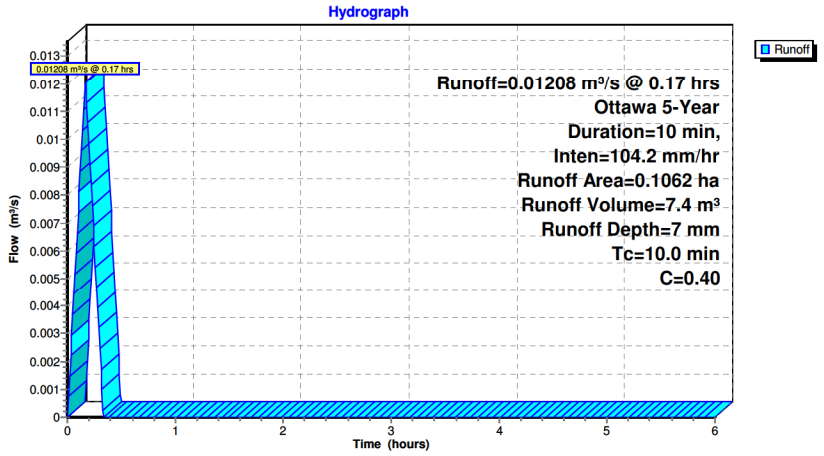
Runoff = 0.01208 m³/s @ 0.17 hrs, Volume= 7.4 m³, Depth= 7 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 5-Year Duration=10 min, Inten=104.2 mm/hr

Area (ha)	C	Description
0.1062	0.40	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

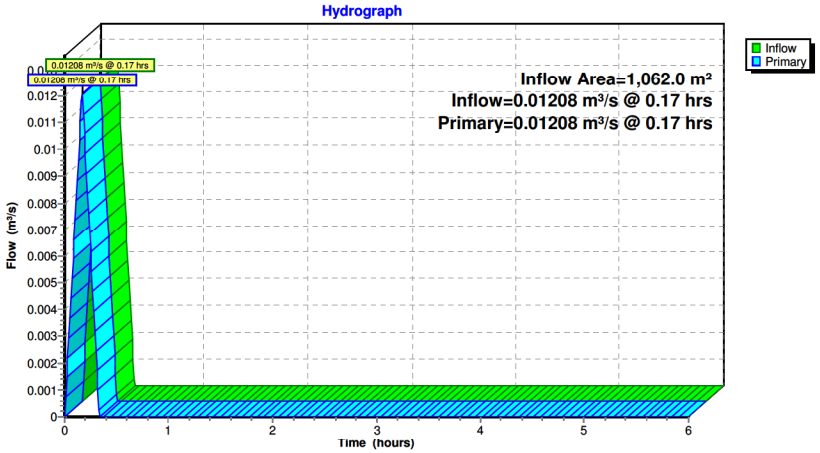


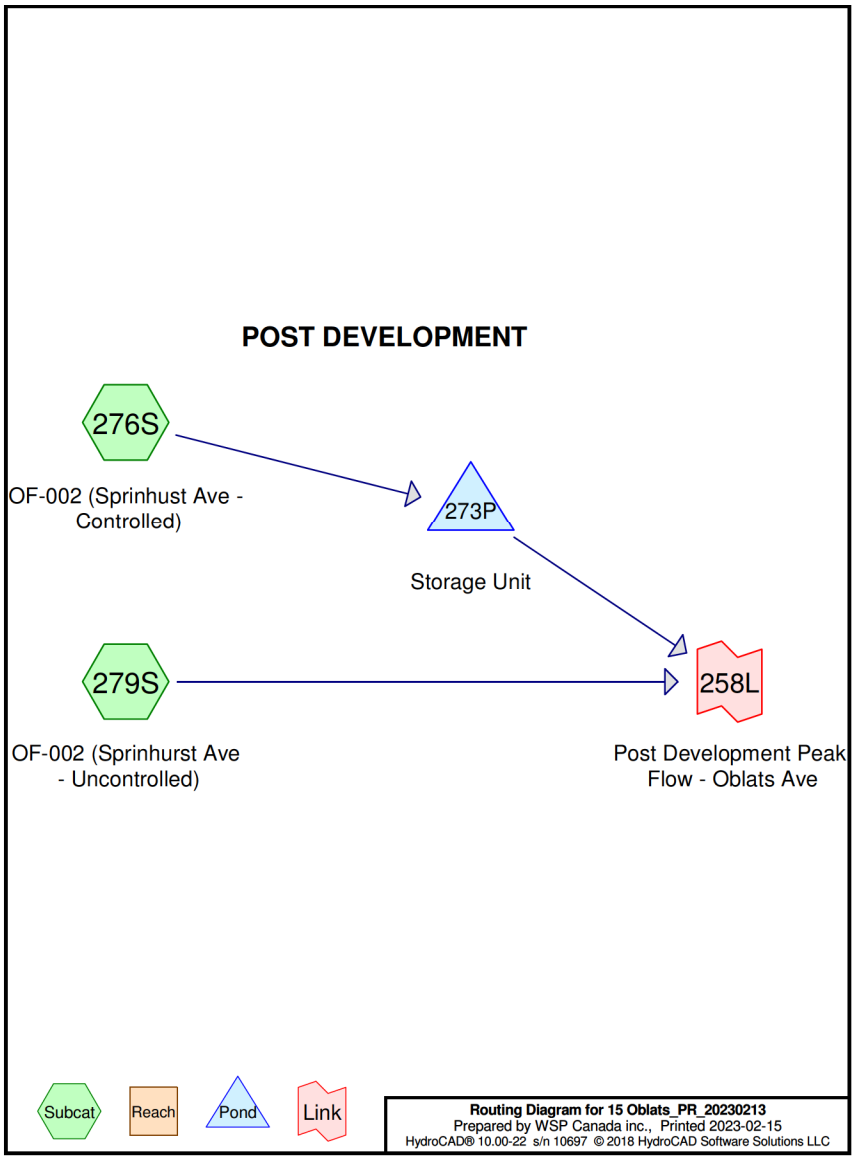
Summary for Link 226L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 7 mm for 5-Year event
Inflow = 0.01208 m³/s @ 0.17 hrs, Volume= 7.4 m³
Primary = 0.01208 m³/s @ 0.17 hrs, Volume= 7.4 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 226L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	0.90	PR-002 (276S)
1,322.0	0.89	PR-003 (276S)
490.0	0.75	PR-004 (276S)
559.0	0.60	PR-005 (276S)
314.0	0.42	PR-006 (276S)
365.0	0.25	PR-007 (279S)
209.0	0.76	PR-008 (279S)
51.0	0.90	PR-009 (279S)
5,710.0	**0.78**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 276S: OF-002 (Sprinhust Runoff Area=0.5085 ha 0.00% Impervious Runoff Depth=25 mm
Tc=10.0 min C=0.82 Runoff=0.04706 m³/s 127.1 m³

Subcatchment 279S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 0.00% Impervious Runoff Depth=14 mm
Tc=10.0 min C=0.47 Runoff=0.00332 m³/s 9.0 m³

Pond 273P: Storage Unit Peak Elev=61.401 m Storage=91.4 m³ Inflow=0.04706 m³/s 127.1 m³
Outflow=0.02895 m³/s 104.8 m³

Link 258L: Post Development Peak Flow - Oblats Ave Inflow=0.03128 m³/s 113.8 m³
Primary=0.03128 m³/s 113.8 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 136.0 m³ Average Runoff Depth = 24 mm
100.00% Pervious = 5,710.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)

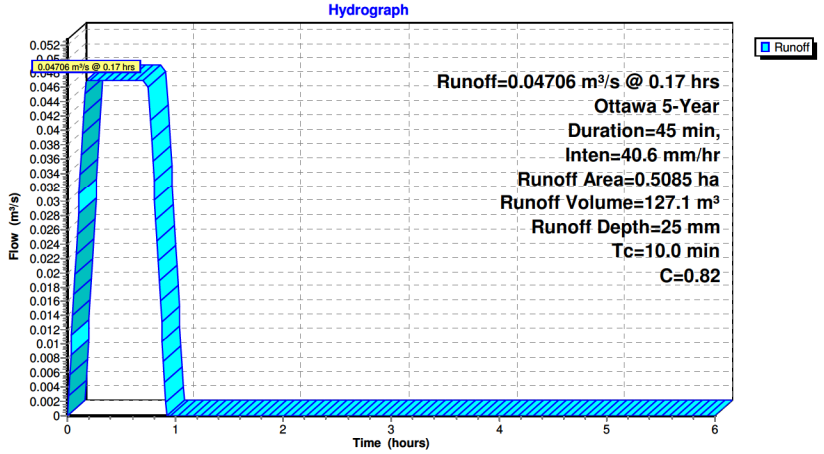
Runoff = 0.04706 m³/s @ 0.17 hrs, Volume= 127.1 m³, Depth= 25 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 5-Year Duration=45 min, Inten=40.6 mm/hr

Area (ha)	C	Description
0.2400	0.90	PR-002
0.1322	0.89	PR-003
0.0490	0.75	PR-004
0.0559	0.60	PR-005
0.0314	0.42	PR-006
0.5085	0.82	Weighted Average
0.5085		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)

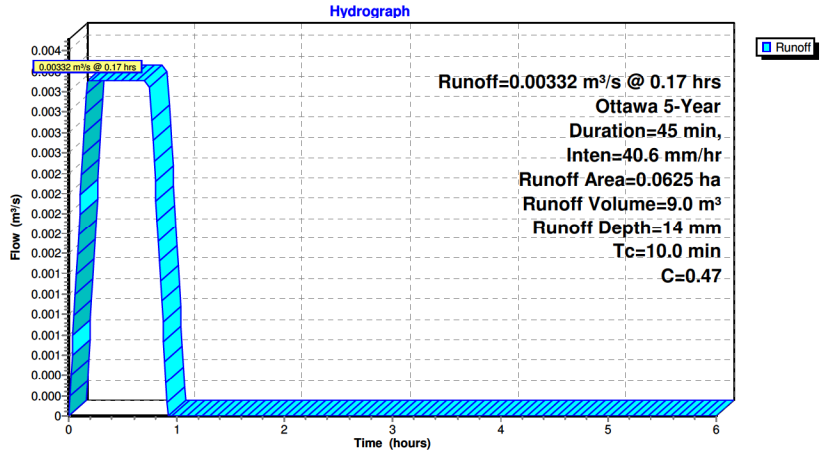
Runoff = 0.00332 m³/s @ 0.17 hrs, Volume= 9.0 m³, Depth= 14 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 5-Year Duration=45 min, Inten=40.6 mm/hr

Area (ha)	C	Description
0.0365	0.25	PR-007
0.0209	0.76	PR-008
0.0051	0.90	PR-009
0.0625	0.47	Weighted Average
0.0625		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 273P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 0.00% Impervious, Inflow Depth = 25 mm for 5-Year event
Inflow = 0.04706 m³/s @ 0.17 hrs, Volume= 127.1 m³
Outflow = 0.02895 m³/s @ 0.81 hrs, Volume= 104.8 m³, Atten= 38%, Lag= 38.7 min
Primary = 0.02895 m³/s @ 0.81 hrs, Volume= 104.8 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 61.401 m @ 0.81 hrs Surf.Area= 0.0 m² Storage= 91.4 m³

Plug-Flow detention time= 66.6 min calculated for 104.7 m³ (82% of inflow)
Center-of-Mass det. time= 63.0 min (90.5 - 27.5)

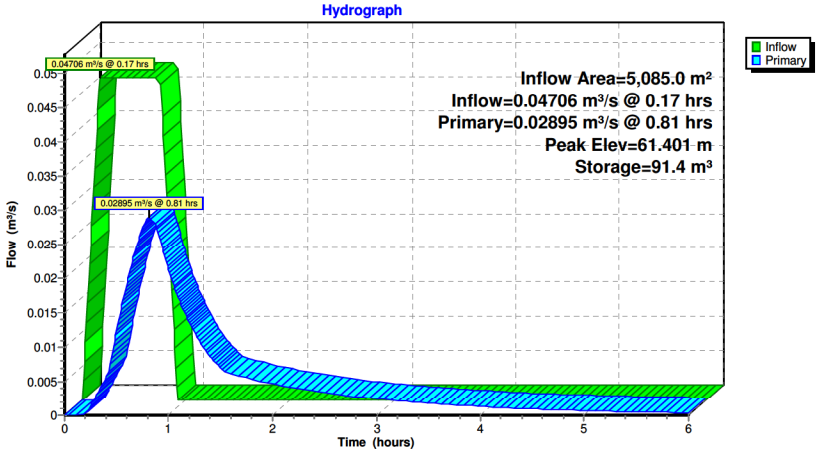
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.02894 m³/s @ 0.81 hrs HW=61.400 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.02894 m³/s)

Pond 273P: Storage Unit

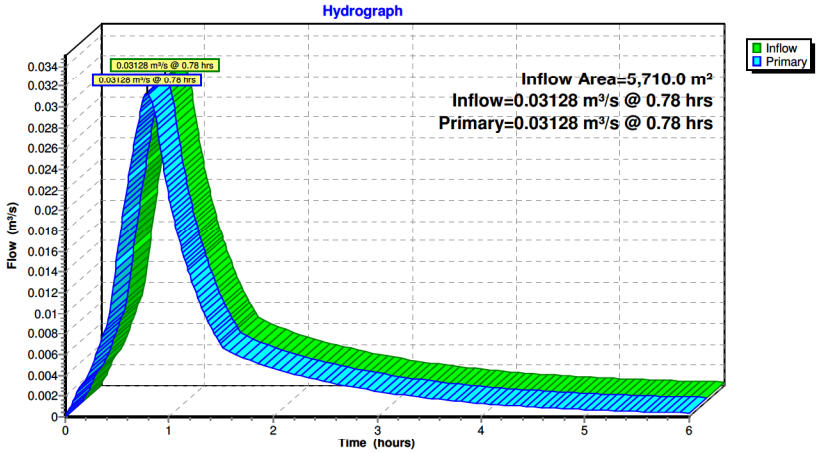


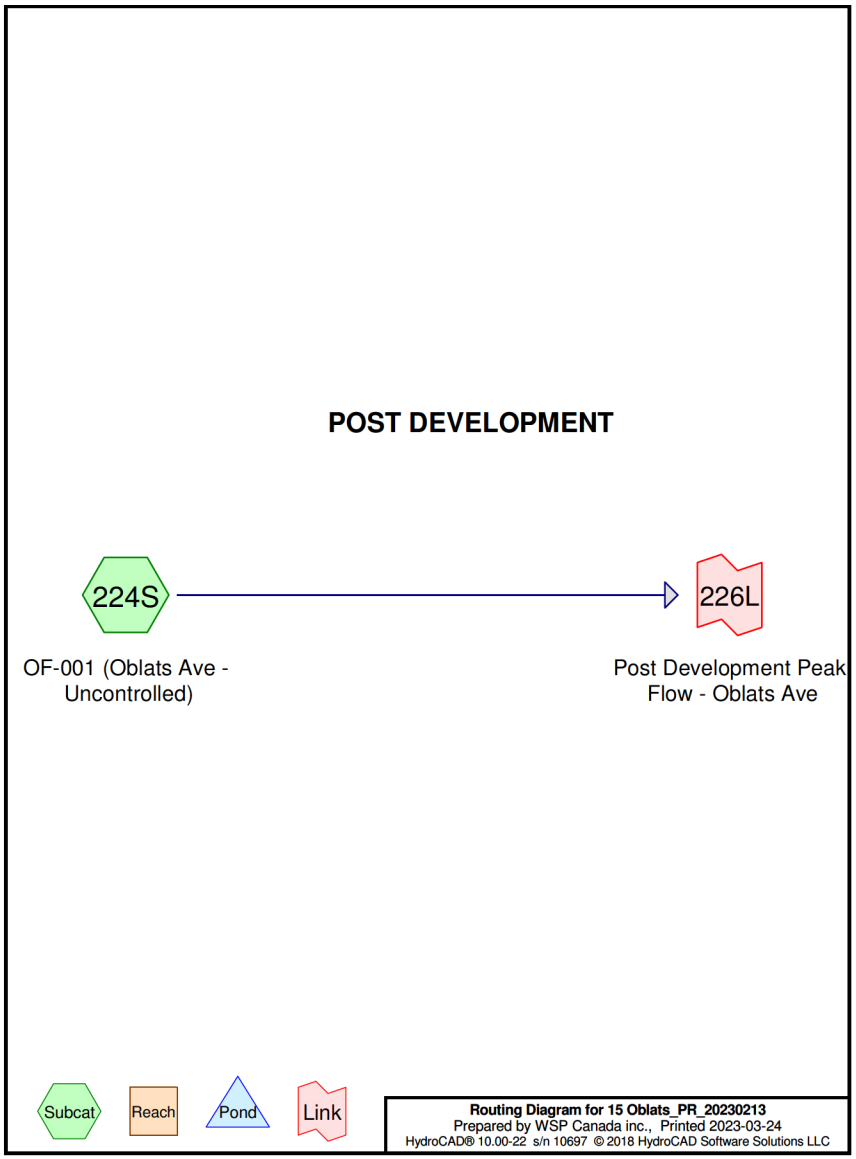
Summary for Link 258L: Post Development Peak Flow - Oblats Ave

Inflow Area = 5,710.0 m², 0.00% Impervious, Inflow Depth > 20 mm for 5-Year event
Inflow = 0.03128 m³/s @ 0.78 hrs, Volume= 113.8 m³
Primary = 0.03128 m³/s @ 0.78 hrs, Volume= 113.8 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 258L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.40	PR-001 (224S)
1,062.0	**0.40**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 224S: OF-001 (Oblats Ave - Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=8 mm
Tc=10.0 min C=0.40 Runoff=0.01416 m³/s 8.6 m³

Link 226L: Post Development Peak Flow - Oblats Ave Inflow=0.01416 m³/s 8.6 m³
Primary=0.01416 m³/s 8.6 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 8.6 m³ Average Runoff Depth = 8 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

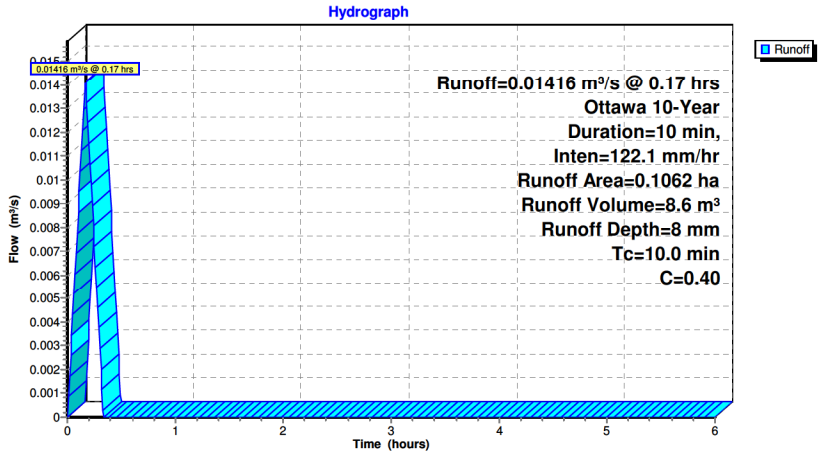
Runoff = 0.01416 m³/s @ 0.17 hrs, Volume= 8.6 m³, Depth= 8 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 10-Year Duration=10 min, Inten=122.1 mm/hr

Area (ha)	C	Description
0.1062	0.40	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 224S: OF-001 (Oblats Ave - Uncontrolled)

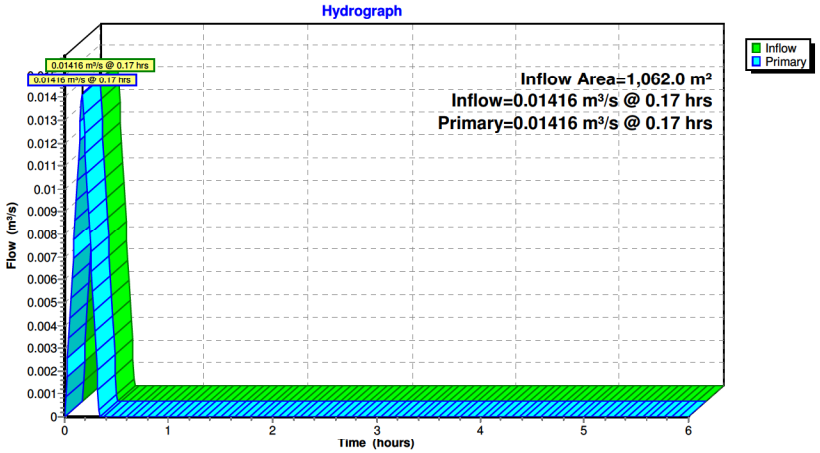


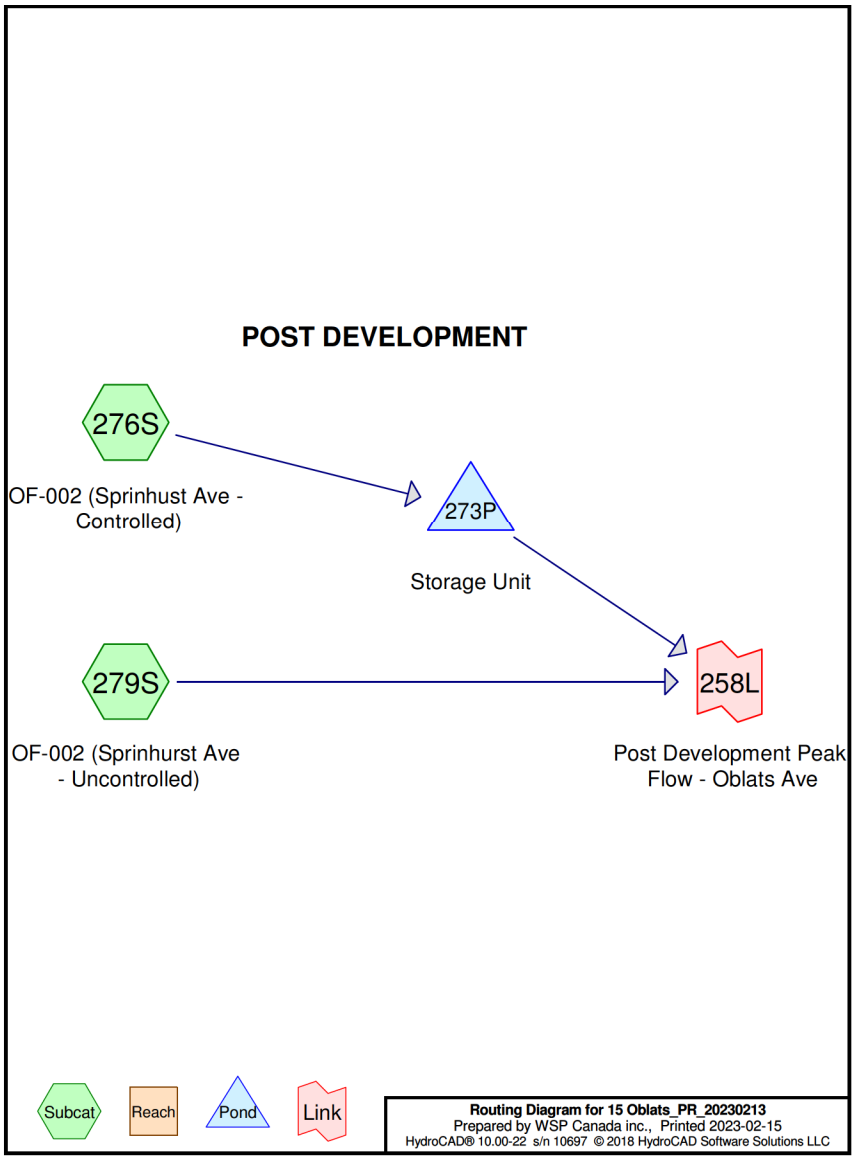
Summary for Link 226L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 8 mm for 10-Year event
Inflow = 0.01416 m³/s @ 0.17 hrs, Volume= 8.6 m³
Primary = 0.01416 m³/s @ 0.17 hrs, Volume= 8.6 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 226L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	0.90	PR-002 (276S)
1,322.0	0.89	PR-003 (276S)
490.0	0.75	PR-004 (276S)
559.0	0.60	PR-005 (276S)
314.0	0.42	PR-006 (276S)
365.0	0.25	PR-007 (279S)
209.0	0.76	PR-008 (279S)
51.0	0.90	PR-009 (279S)
5,710.0	**0.78**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 276S: OF-002 (Sprinhust Runoff Area=0.5085 ha 0.00% Impervious Runoff Depth=28 mm
Tc=10.0 min C=0.82 Runoff=0.05979 m³/s 143.5 m³

Subcatchment 279S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 0.00% Impervious Runoff Depth=16 mm
Tc=10.0 min C=0.47 Runoff=0.00421 m³/s 10.1 m³

Pond 273P: Storage Unit Peak Elev=61.501 m Storage=102.0 m³ Inflow=0.05979 m³/s 143.5 m³
Outflow=0.03578 m³/s 121.3 m³

Link 258L: Post Development Peak Flow - Oblats Ave Inflow=0.03868 m³/s 131.4 m³
Primary=0.03868 m³/s 131.4 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 153.6 m³ Average Runoff Depth = 27 mm
100.00% Pervious = 5,710.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)

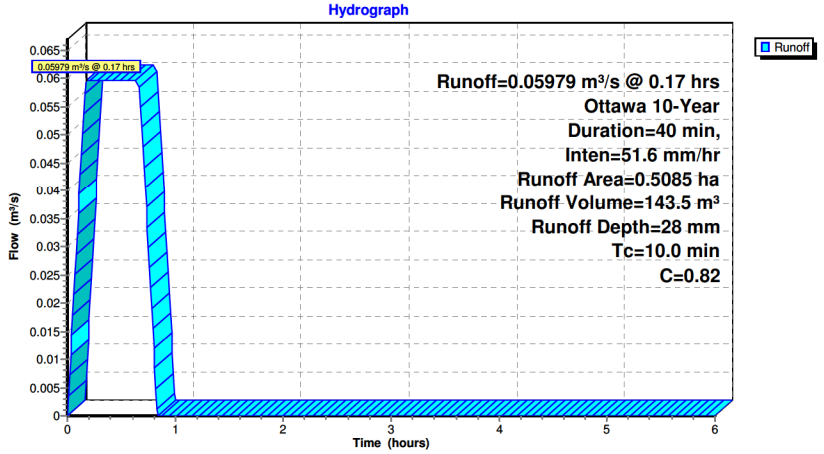
Runoff = 0.05979 m³/s @ 0.17 hrs, Volume= 143.5 m³, Depth= 28 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 10-Year Duration=40 min, Inten=51.6 mm/hr

Area (ha)	C	Description
0.2400	0.90	PR-002
0.1322	0.89	PR-003
0.0490	0.75	PR-004
0.0559	0.60	PR-005
0.0314	0.42	PR-006
0.5085	0.82	Weighted Average
0.5085		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 276S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)

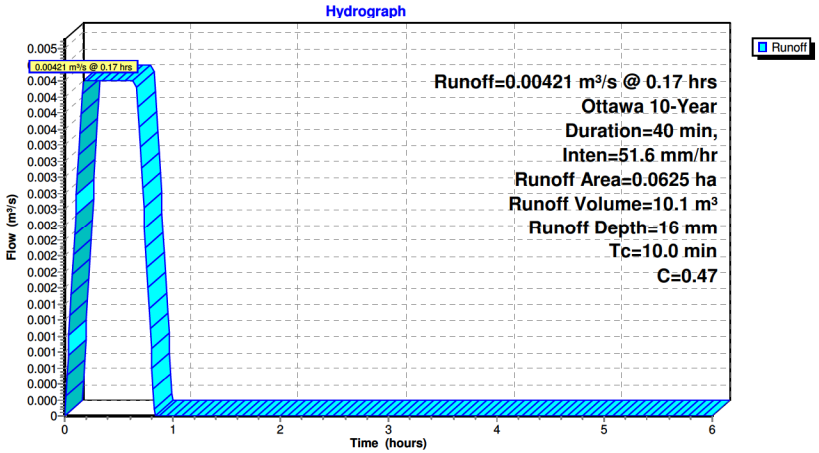
Runoff = 0.00421 m³/s @ 0.17 hrs, Volume= 10.1 m³, Depth= 16 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 10-Year Duration=40 min, Inten=51.6 mm/hr

Area (ha)	C	Description
0.0365	0.25	PR-007
0.0209	0.76	PR-008
0.0051	0.90	PR-009
0.0625	0.47	Weighted Average
0.0625		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 279S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 273P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 0.00% Impervious, Inflow Depth = 28 mm for 10-Year event
Inflow = 0.05979 m³/s @ 0.17 hrs, Volume= 143.5 m³
Outflow = 0.03578 m³/s @ 0.73 hrs, Volume= 121.3 m³, Atten= 40%, Lag= 33.8 min
Primary = 0.03578 m³/s @ 0.73 hrs, Volume= 121.3 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 61.501 m @ 0.73 hrs Surf.Area= 0.0 m² Storage= 102.0 m³

Plug-Flow detention time= 61.6 min calculated for 121.3 m³ (85% of inflow)
Center-of-Mass det. time= 58.4 min (83.4 - 25.0)

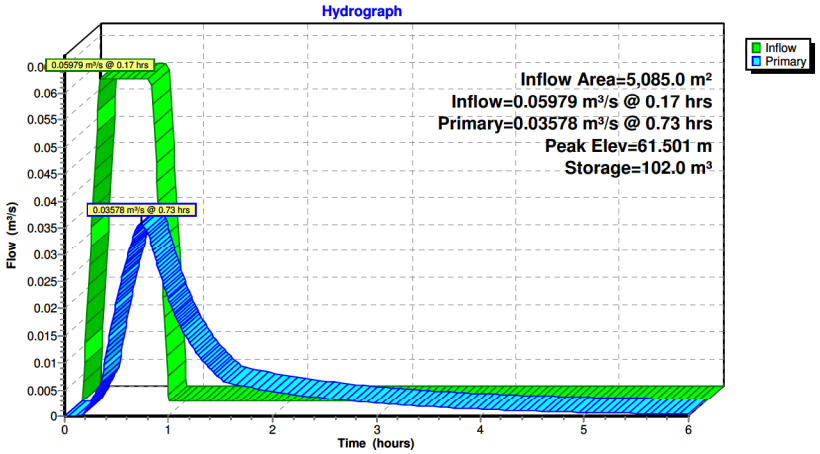
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.03577 m³/s @ 0.73 hrs HW=61.501 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.03577 m³/s)

Pond 273P: Storage Unit

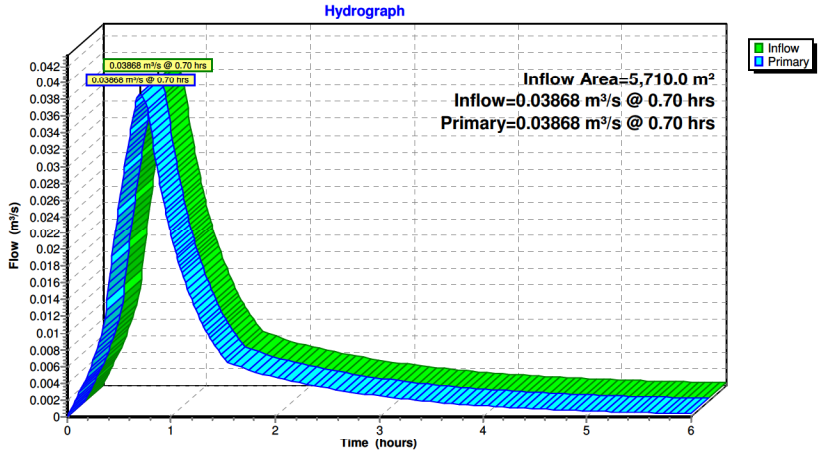


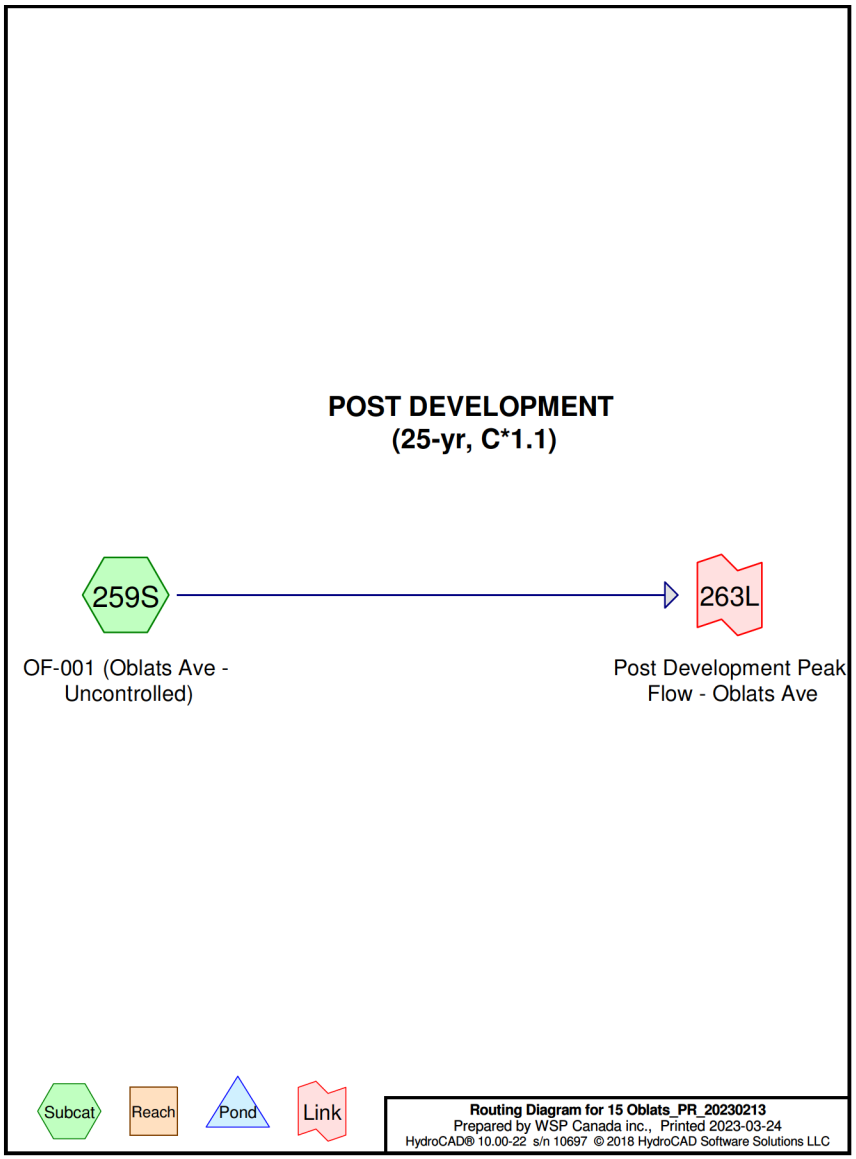
Summary for Link 258L: Post Development Peak Flow - Oblats Ave

Inflow Area = 5,710.0 m², 0.00% Impervious, Inflow Depth > 23 mm for 10-Year event
Inflow = 0.03868 m³/s @ 0.70 hrs, Volume= 131.4 m³
Primary = 0.03868 m³/s @ 0.70 hrs, Volume= 131.4 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 258L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.44	PR-001 (259S)
1,062.0	**0.44**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 259S: OF-001 (Oblats Ave Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=11 mm
Tc=10.0 min C=0.44 Runoff=0.01845 m³/s 11.3 m³

Link 263L: Post Development Peak Flow - Oblats Ave Inflow=0.01845 m³/s 11.3 m³
Primary=0.01845 m³/s 11.3 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 11.3 m³ Average Runoff Depth = 11 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

15 Oblats_PR_20230213 *Ottawa 25-Year Duration=10 min, Inten=144.7 mm/hr*
Prepared by WSP Canada inc. Printed 2023-03-24

Summary for Subcatchment 259S: OF-001 (Oblats Ave - Uncontrolled)

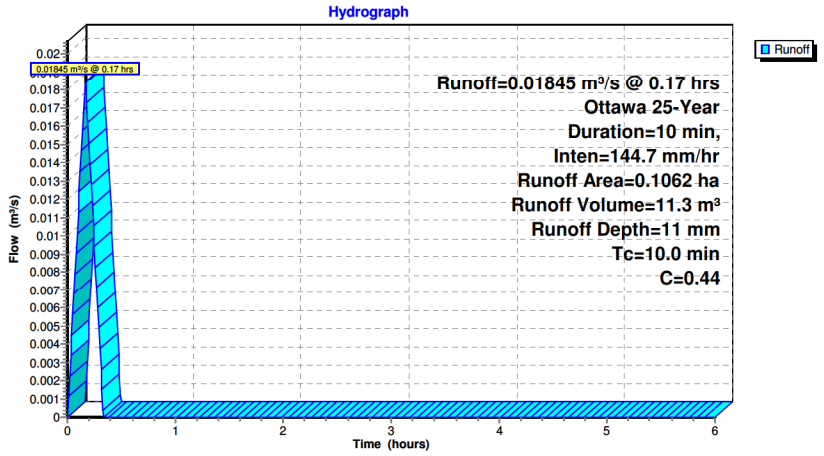
Runoff = 0.01845 m³/s @ 0.17 hrs, Volume= 11.3 m³, Depth= 11 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 25-Year Duration=10 min, Inten=144.7 mm/hr

Area (ha)	C	Description
0.1062	0.44	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 259S: OF-001 (Oblats Ave - Uncontrolled)

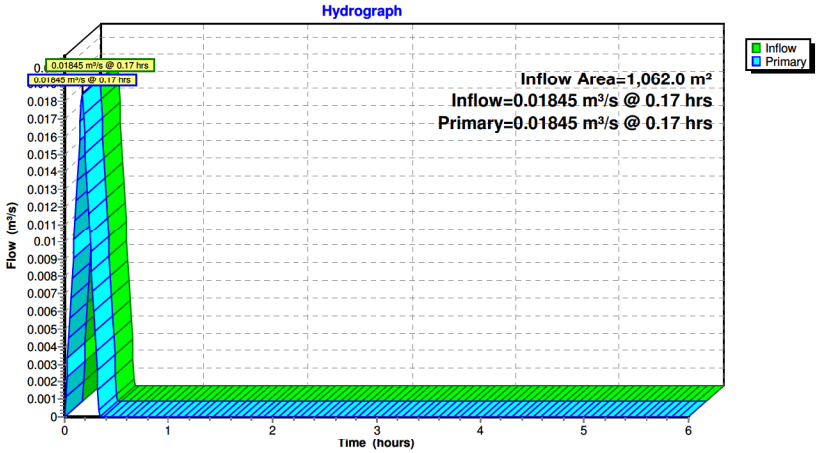


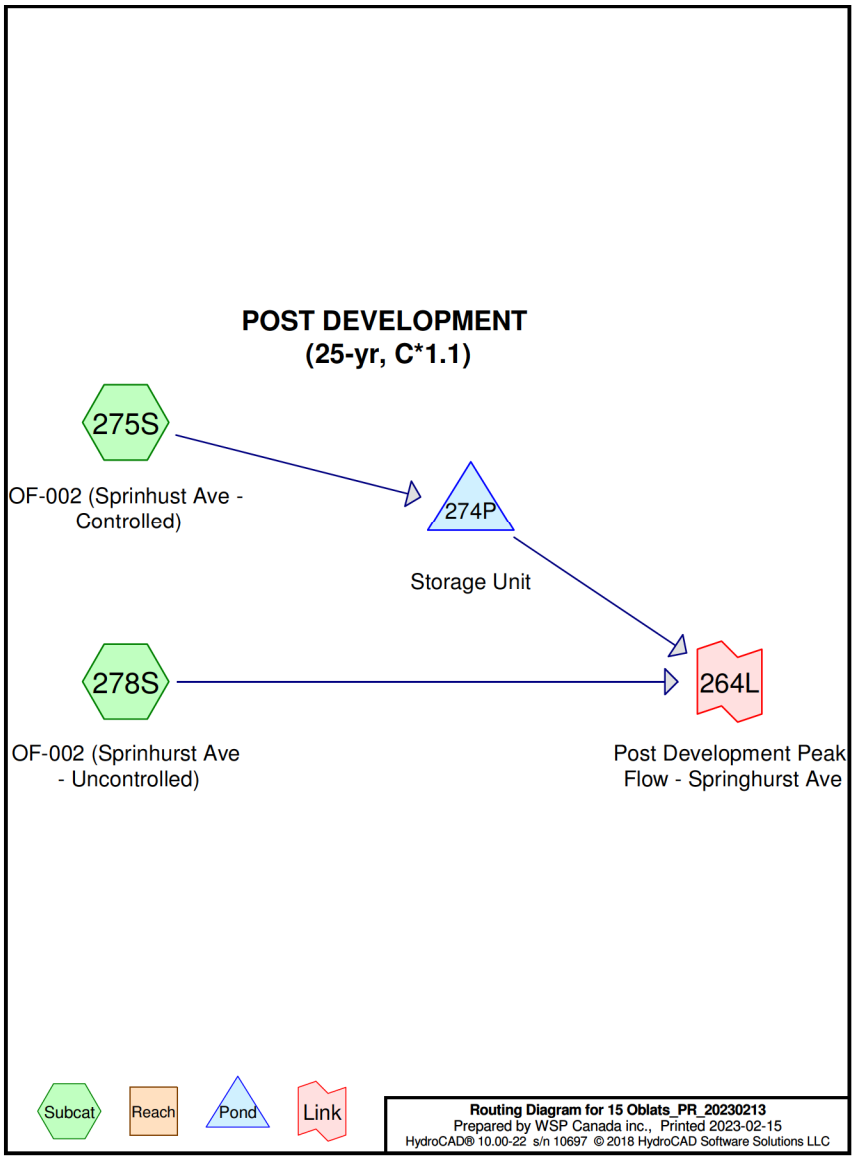
Summary for Link 263L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 11 mm for 25-Year event
Inflow = 0.01845 m³/s @ 0.17 hrs, Volume= 11.3 m³
Primary = 0.01845 m³/s @ 0.17 hrs, Volume= 11.3 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 263L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	0.99	PR-002 (275S)
1,322.0	0.98	PR-003 (275S)
490.0	0.83	PR-004 (275S)
559.0	0.66	PR-005 (275S)
314.0	0.46	PR-006 (275S)
365.0	0.28	PR-007 (278S)
209.0	0.84	PR-008 (278S)
51.0	0.99	PR-009 (278S)
5,710.0	**0.86**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 275S: OF-002 (Sprinhust Runoff Area=0.5085 ha 73.20% Impervious Runoff Depth=35 mm
Tc=10.0 min C=0.90 Runoff=0.08872 m³/s 175.7 m³

Subcatchment 278S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 8.16% Impervious Runoff Depth=20 mm
Tc=10.0 min C=0.53 Runoff=0.00642 m³/s 12.7 m³

Pond 274P: Storage Unit Peak Elev=61.742 m Storage=125.5 m³ Inflow=0.08872 m³/s 175.7 m³
Outflow=0.04427 m³/s 153.4 m³

Link 264L: Post Development Peak Flow - Springhurst Ave Inflow=0.04908 m³/s 166.1 m³
Primary=0.04908 m³/s 166.1 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 188.4 m³ Average Runoff Depth = 33 mm
33.92% Pervious = 1,937.0 m² 66.08% Impervious = 3,773.0 m²

Summary for Subcatchment 275S: OF-002 (Sprinhust Ave - Controlled)

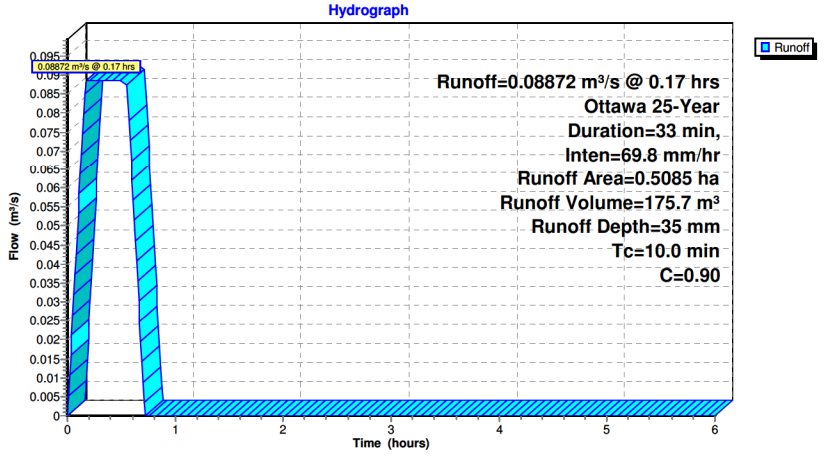
Runoff = 0.08872 m³/s @ 0.17 hrs, Volume= 175.7 m³, Depth= 35 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 25-Year Duration=33 min, Inten=69.8 mm/hr

Area (ha)	C	Description
0.2400	0.99	PR-002
0.1322	0.98	PR-003
0.0490	0.83	PR-004
0.0559	0.66	PR-005
0.0314	0.46	PR-006
0.5085	0.90	Weighted Average
0.1363		26.80% Pervious Area
0.3722		73.20% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 275S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 278S: OF-002 (Sprinhurst Ave - Uncontrolled)

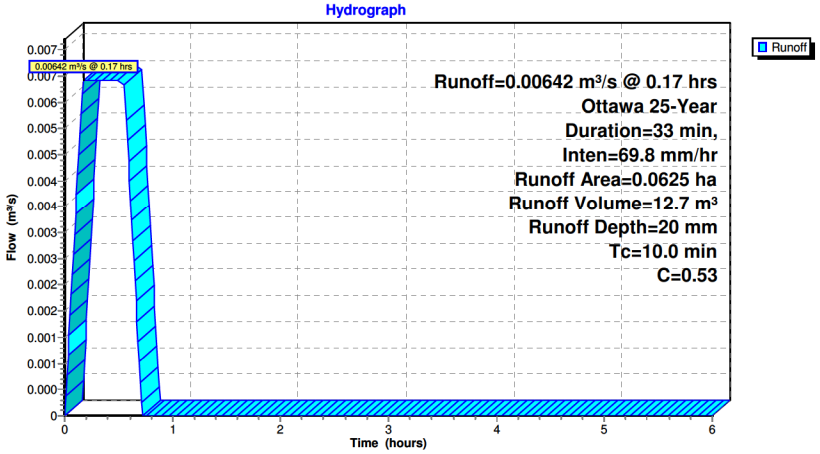
Runoff = 0.00642 m³/s @ 0.17 hrs, Volume= 12.7 m³, Depth= 20 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 25-Year Duration=33 min, Inten=69.8 mm/hr

Area (ha)	C	Description
0.0365	0.28	PR-007
0.0209	0.84	PR-008
0.0051	0.99	PR-009
0.0625	0.53	Weighted Average
0.0574		91.84% Pervious Area
0.0051		8.16% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 278S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 274P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 73.20% Impervious, Inflow Depth = 35 mm for 25-Year event
Inflow = 0.08872 m³/s @ 0.17 hrs, Volume= 175.7 m³
Outflow = 0.04427 m³/s @ 0.63 hrs, Volume= 153.4 m³, Atten= 50%, Lag= 27.8 min
Primary = 0.04427 m³/s @ 0.63 hrs, Volume= 153.4 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 61.742 m @ 0.63 hrs Surf.Area= 0.0 m² Storage= 125.5 m³

Plug-Flow detention time= 54.7 min calculated for 153.1 m³ (87% of inflow)
Center-of-Mass det. time= 52.9 min (74.4 - 21.5)

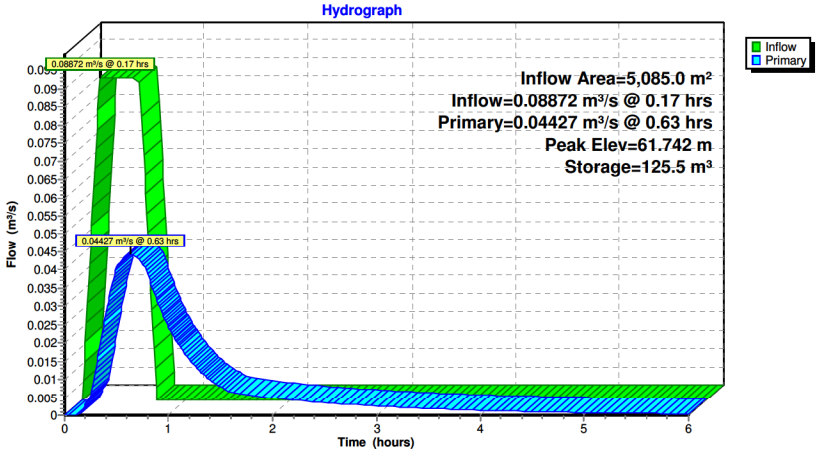
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.04426 m³/s @ 0.63 hrs HW=61.741 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.04426 m³/s)

Pond 274P: Storage Unit

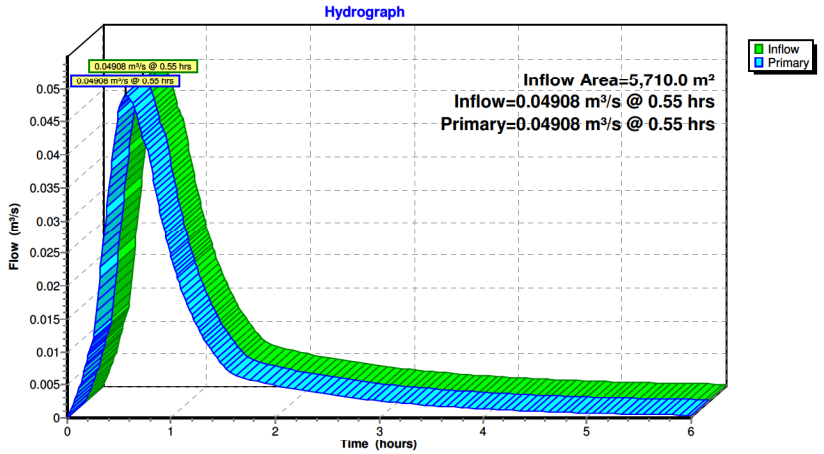


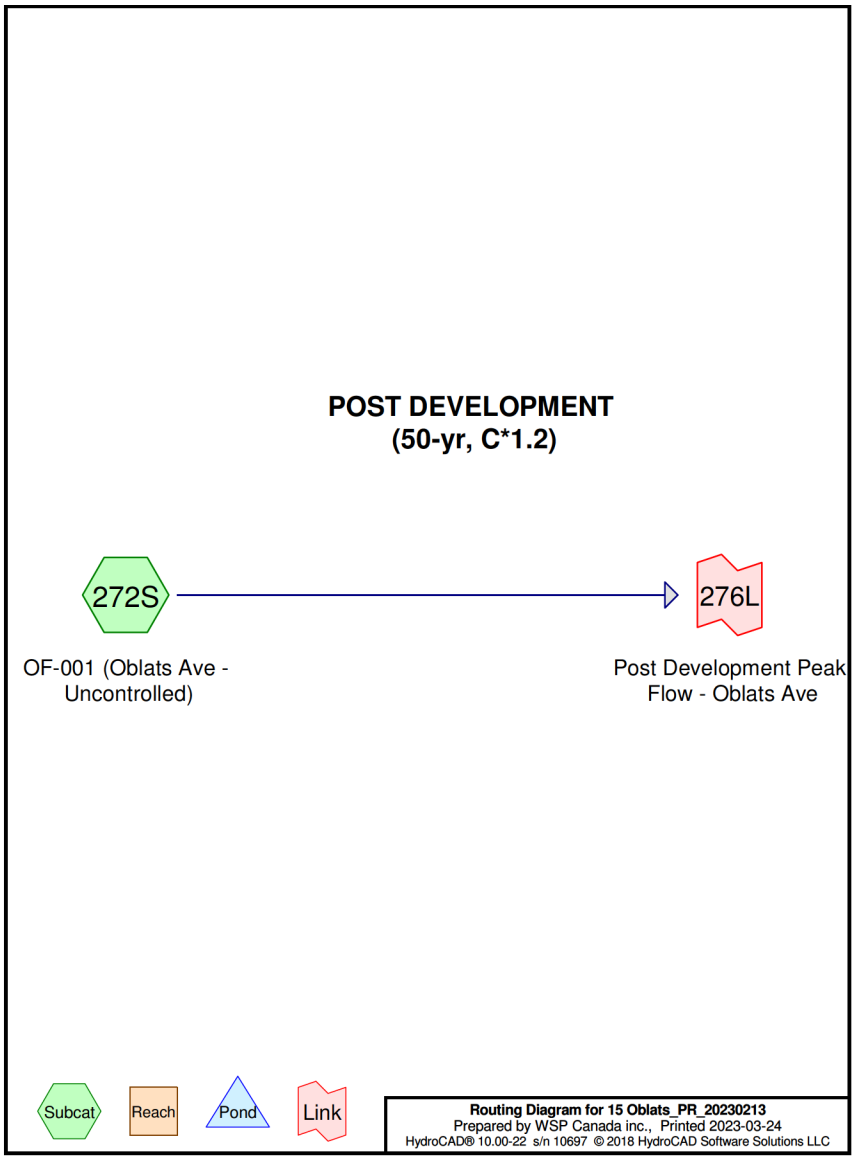
Summary for Link 264L: Post Development Peak Flow - Springhurst Ave

Inflow Area = 5,710.0 m², 66.08% Impervious, Inflow Depth > 29 mm for 25-Year event
Inflow = 0.04908 m³/s @ 0.55 hrs, Volume= 166.1 m³
Primary = 0.04908 m³/s @ 0.55 hrs, Volume= 166.1 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 264L: Post Development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.48	PR-001 (272S)
1,062.0	**0.48**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 272S: OF-001 (Oblats Ave Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=13 mm
Tc=10.0 min C=0.48 Runoff=0.02246 m³/s 13.7 m³

Link 276L: Post Development Peak Flow - Oblats Ave Inflow=0.02246 m³/s 13.7 m³
Primary=0.02246 m³/s 13.7 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 13.7 m³ Average Runoff Depth = 13 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 272S: OF-001 (Oblats Ave - Uncontrolled)

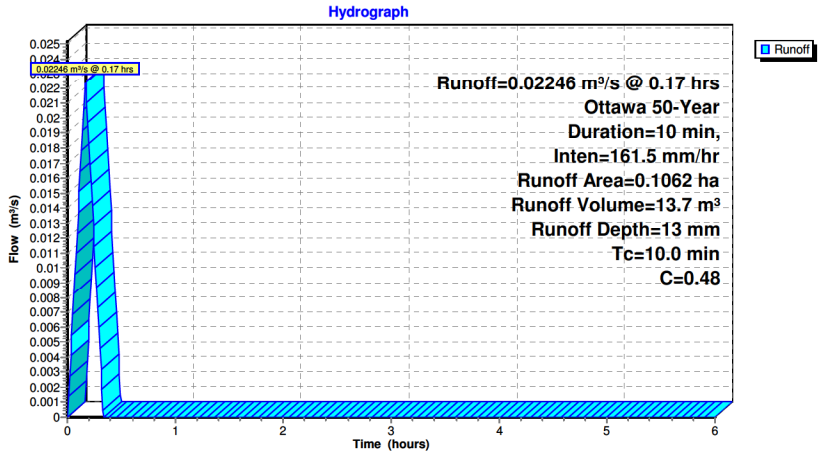
Runoff = 0.02246 m³/s @ 0.17 hrs, Volume= 13.7 m³, Depth= 13 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 50-Year Duration=10 min, Inten=161.5 mm/hr

Area (ha)	C	Description
0.1062	0.48	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 272S: OF-001 (Oblats Ave - Uncontrolled)

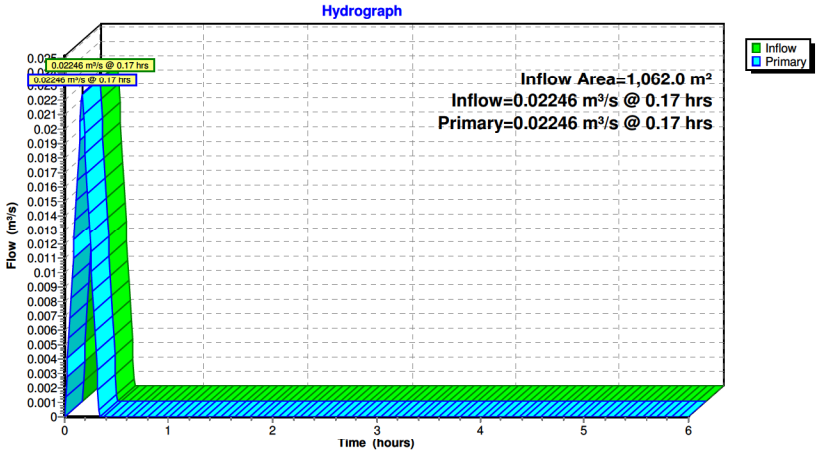


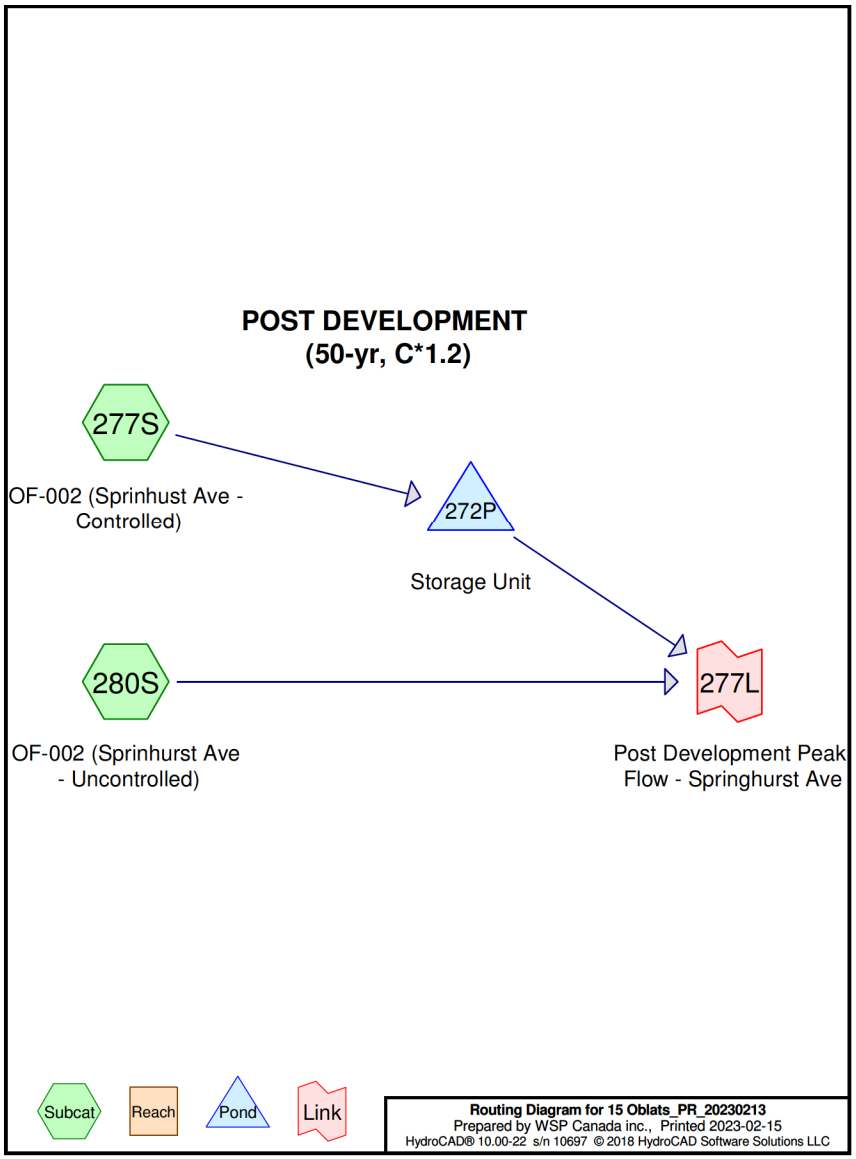
Summary for Link 276L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 13 mm for 50-Year event
Inflow = 0.02246 m³/s @ 0.17 hrs, Volume= 13.7 m³
Primary = 0.02246 m³/s @ 0.17 hrs, Volume= 13.7 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 276L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	1.00	PR-002 (277S)
1,322.0	1.00	PR-003 (277S)
490.0	0.90	PR-004 (277S)
559.0	0.72	PR-005 (277S)
314.0	0.51	PR-006 (277S)
365.0	0.30	PR-007 (280S)
209.0	0.92	PR-008 (280S)
51.0	1.00	PR-009 (280S)
5,710.0	**0.89**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 277S: OF-002 (Sprinhust Runoff Area=0.5085 ha 73.20% Impervious Runoff Depth=41 mm
Tc=10.0 min C=0.93 Runoff=0.09810 m³/s 206.0 m³

Subcatchment 280S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 8.16% Impervious Runoff Depth=24 mm
Tc=10.0 min C=0.56 Runoff=0.00726 m³/s 15.2 m³

Pond 272P: Storage Unit Peak Elev=61.972 m Storage=143.4 m³ Inflow=0.09810 m³/s 206.0 m³
Outflow=0.04936 m³/s 183.5 m³

Link 277L: Post Development Peak Flow - Springhurst Ave Inflow=0.05448 m³/s 198.7 m³
Primary=0.05448 m³/s 198.7 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 221.2 m³ Average Runoff Depth = 39 mm
33.92% Pervious = 1,937.0 m² 66.08% Impervious = 3,773.0 m²

Summary for Subcatchment 277S: OF-002 (Sprinhust Ave - Controlled)

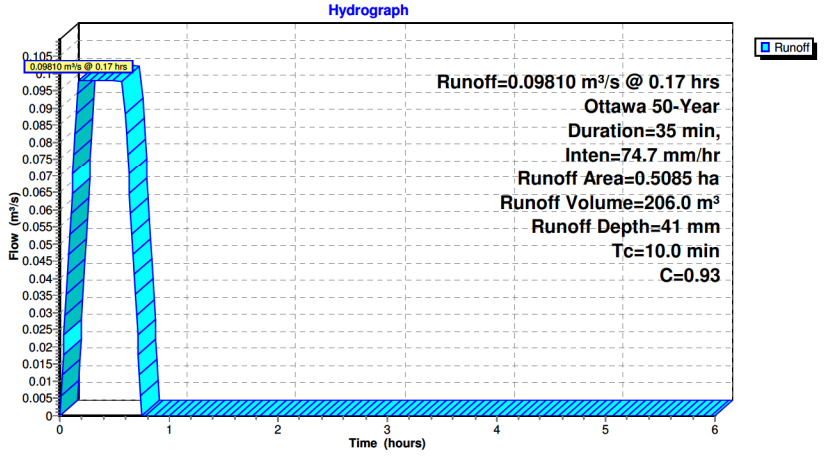
Runoff = 0.09810 m³/s @ 0.17 hrs, Volume= 206.0 m³, Depth= 41 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 50-Year Duration=35 min, Inten=74.7 mm/hr

Area (ha)	C	Description
0.2400	1.00	PR-002
0.1322	1.00	PR-003
0.0490	0.90	PR-004
0.0559	0.72	PR-005
0.0314	0.51	PR-006
0.5085	0.93	Weighted Average
0.1363		26.80% Pervious Area
0.3722		73.20% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 277S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 280S: OF-002 (Sprinhurst Ave - Uncontrolled)

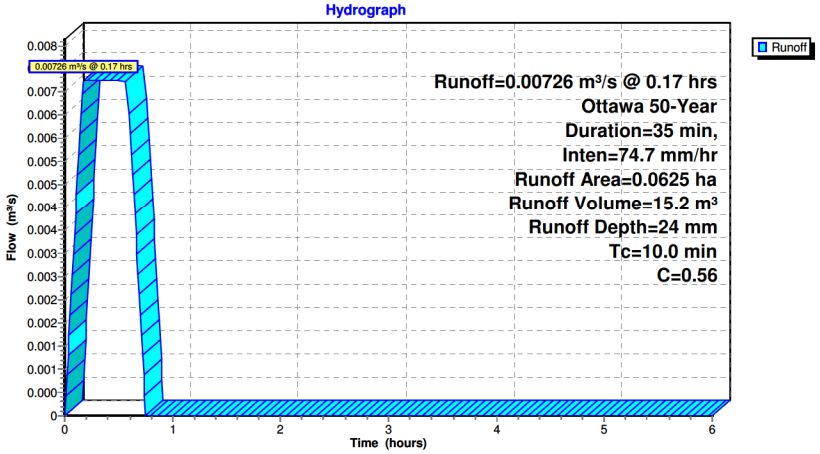
Runoff = 0.00726 m³/s @ 0.17 hrs, Volume= 15.2 m³, Depth= 24 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 50-Year Duration=35 min, Inten=74.7 mm/hr

Area (ha)	C	Description
0.0365	0.30	PR-007
0.0209	0.92	PR-008
0.0051	1.00	PR-009
0.0625	0.56	Weighted Average
0.0574		91.84% Pervious Area
0.0051		8.16% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 280S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 272P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 73.20% Impervious, Inflow Depth = 41 mm for 50-Year event
Inflow = 0.09810 m³/s @ 0.17 hrs, Volume= 206.0 m³
Outflow = 0.04936 m³/s @ 0.67 hrs, Volume= 183.5 m³, Atten= 50%, Lag= 29.8 min
Primary = 0.04936 m³/s @ 0.67 hrs, Volume= 183.5 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 61.972 m @ 0.67 hrs Surf.Area= 0.0 m² Storage= 143.4 m³

Plug-Flow detention time= 52.8 min calculated for 183.5 m³ (89% of inflow)
Center-of-Mass det. time= 50.8 min (73.3 - 22.5)

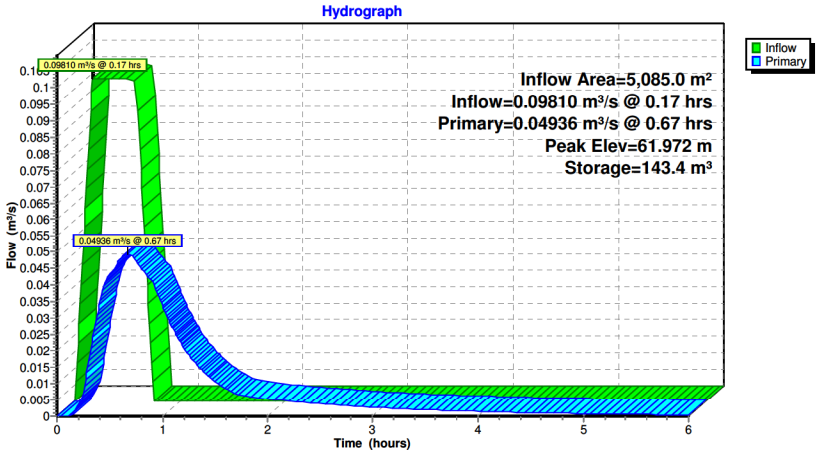
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.04935 m³/s @ 0.67 hrs HW=61.972 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.04935 m³/s)

Pond 272P: Storage Unit

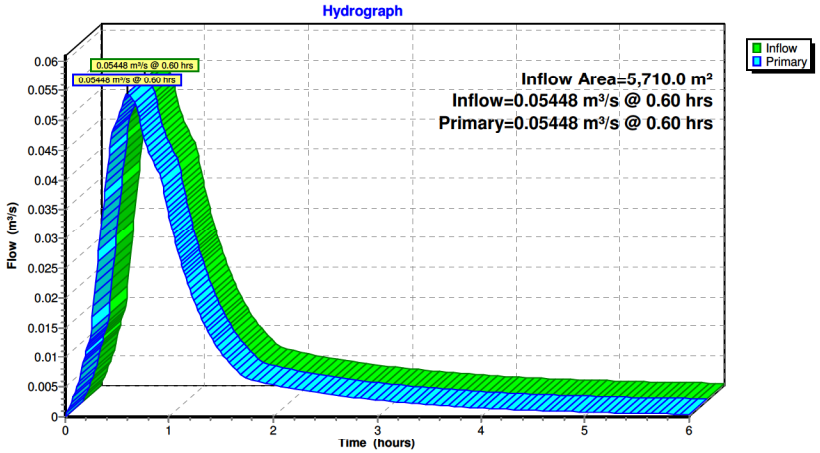


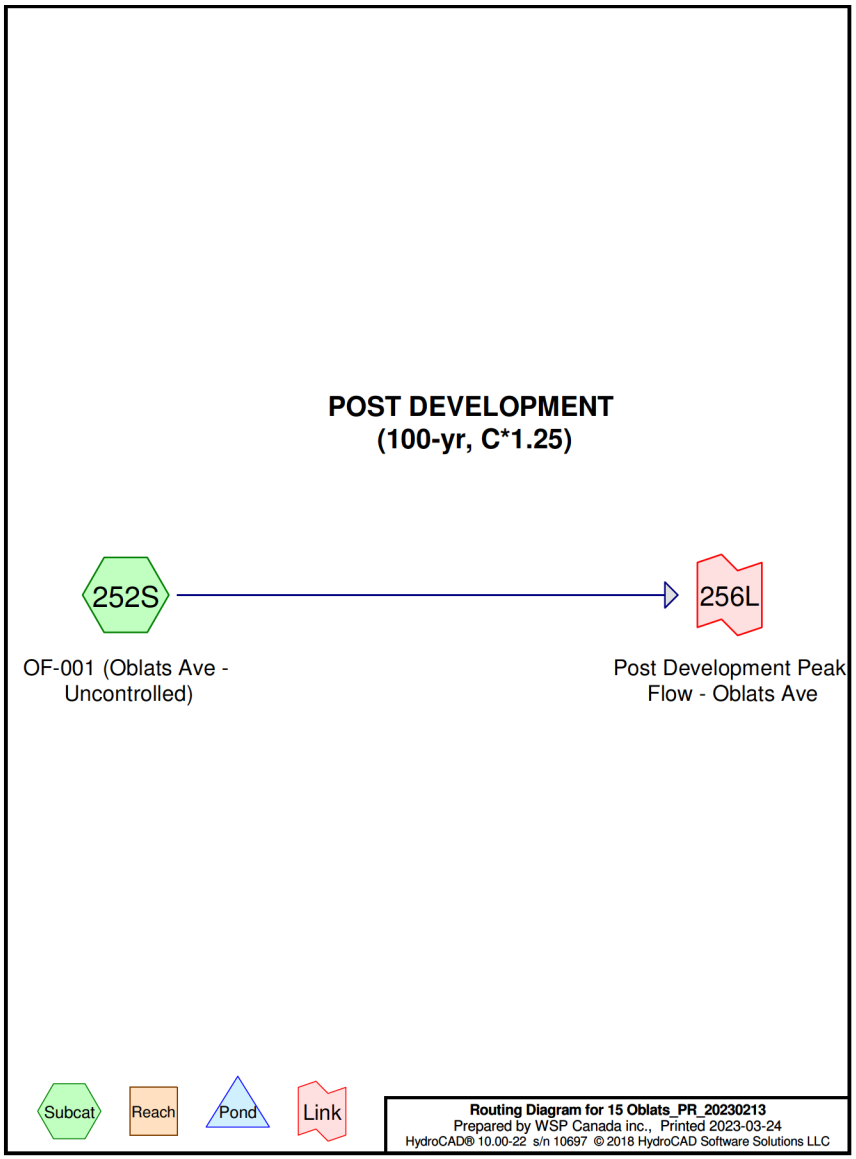
Summary for Link 277L: Post Development Peak Flow - Springhurst Ave

Inflow Area = 5,710.0 m², 66.08% Impervious, Inflow Depth > 35 mm for 50-Year event
Inflow = 0.05448 m³/s @ 0.60 hrs, Volume= 198.7 m³
Primary = 0.05448 m³/s @ 0.60 hrs, Volume= 198.7 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 277L: Post Development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
1,062.0	0.50	PR-001 (252S)
1,062.0	**0.50**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 252S: OF-001 (Oblats Ave Runoff Area=0.1062 ha 0.00% Impervious Runoff Depth=15 mm
Tc=10.0 min C=0.50 Runoff=0.02588 m³/s 15.8 m³

Link 256L: Post Development Peak Flow - Oblats Ave Inflow=0.02588 m³/s 15.8 m³
Primary=0.02588 m³/s 15.8 m³

Total Runoff Area = 1,062.0 m² Runoff Volume = 15.8 m³ Average Runoff Depth = 15 mm
100.00% Pervious = 1,062.0 m² 0.00% Impervious = 0.0 m²

Summary for Subcatchment 252S: OF-001 (Oblats Ave - Uncontrolled)

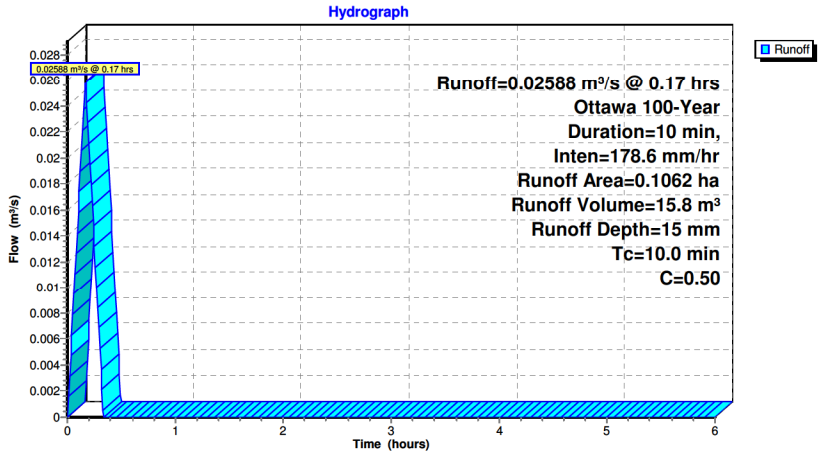
Runoff = 0.02588 m³/s @ 0.17 hrs, Volume= 15.8 m³, Depth= 15 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=10 min, Inten=178.6 mm/hr

Area (ha)	C	Description
0.1062	0.50	PR-001
0.1062		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 252S: OF-001 (Oblats Ave - Uncontrolled)

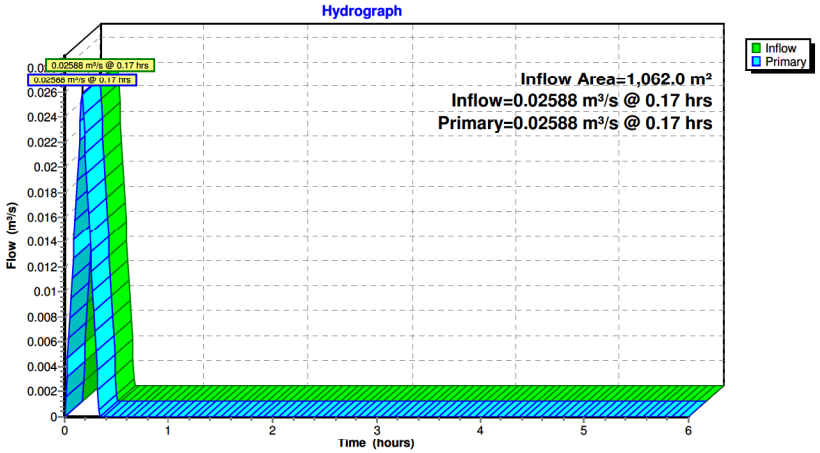


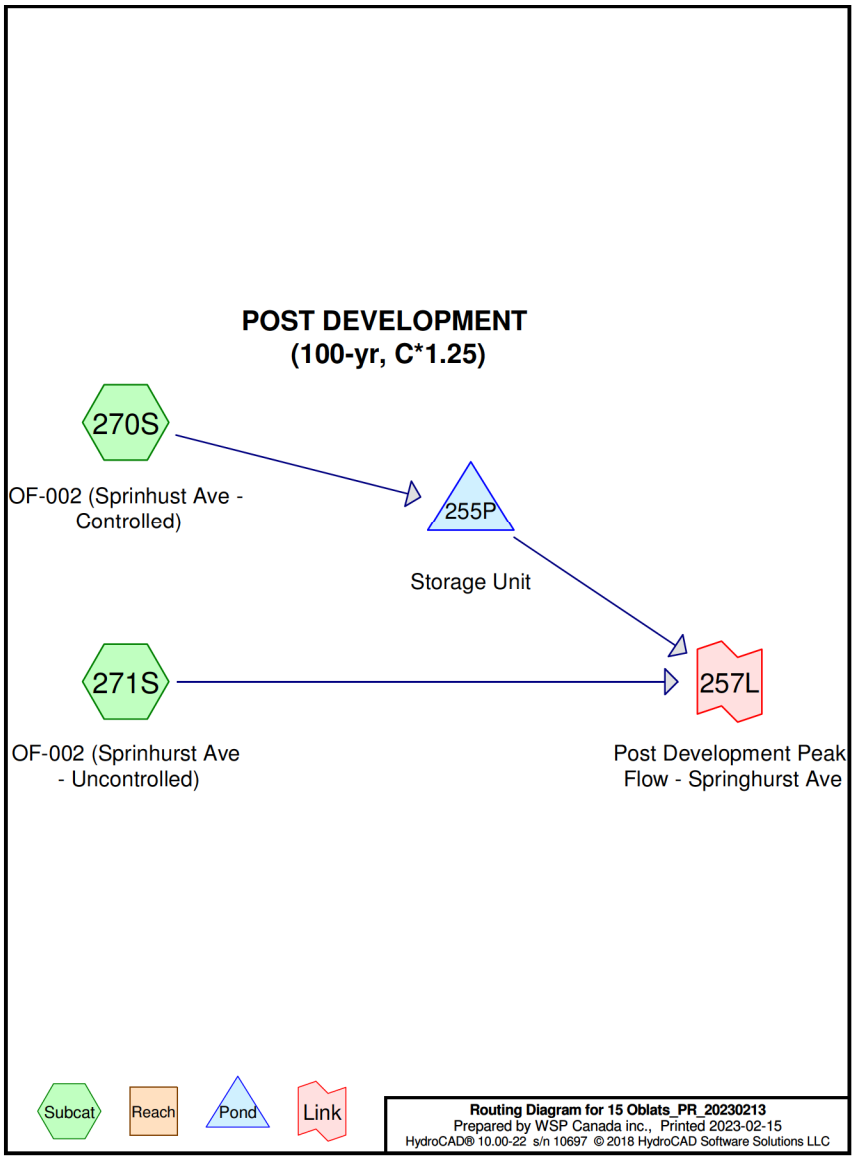
Summary for Link 256L: Post Development Peak Flow - Oblats Ave

Inflow Area = 1,062.0 m², 0.00% Impervious, Inflow Depth = 15 mm for 100-Year event
Inflow = 0.02588 m³/s @ 0.17 hrs, Volume= 15.8 m³
Primary = 0.02588 m³/s @ 0.17 hrs, Volume= 15.8 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 256L: Post Development Peak Flow - Oblats Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	1.00	PR-002 (270S)
1,322.0	1.00	PR-003 (270S)
490.0	0.94	PR-004 (270S)
559.0	0.75	PR-005 (270S)
314.0	0.53	PR-006 (270S)
365.0	0.31	PR-007 (271S)
209.0	0.96	PR-008 (271S)
51.0	1.00	PR-009 (271S)
5,710.0	**0.90**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 270S: OF-002 (Sprinhust Runoff Area=0.5085 ha 73.20% Impervious Runoff Depth=45 mm
Tc=10.0 min C=0.94 Runoff=0.10964 m³/s 230.2 m³

Subcatchment 271S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 41.60% Impervious Runoff Depth=28 mm
Tc=10.0 min C=0.58 Runoff=0.00832 m³/s 17.5 m³

Pond 255P: Storage Unit Peak Elev=62.233 m Storage=159.5 m³ Inflow=0.10964 m³/s 230.2 m³
Outflow=0.05422 m³/s 207.6 m³

Link 257L: Post Development Peak Flow - Springhurst Ave Inflow=0.06021 m³/s 225.0 m³
Primary=0.06021 m³/s 225.0 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 247.7 m³ Average Runoff Depth = 43 mm
30.26% Pervious = 1,728.0 m² 69.74% Impervious = 3,982.0 m²

Summary for Subcatchment 270S: OF-002 (Sprinhust Ave - Controlled)

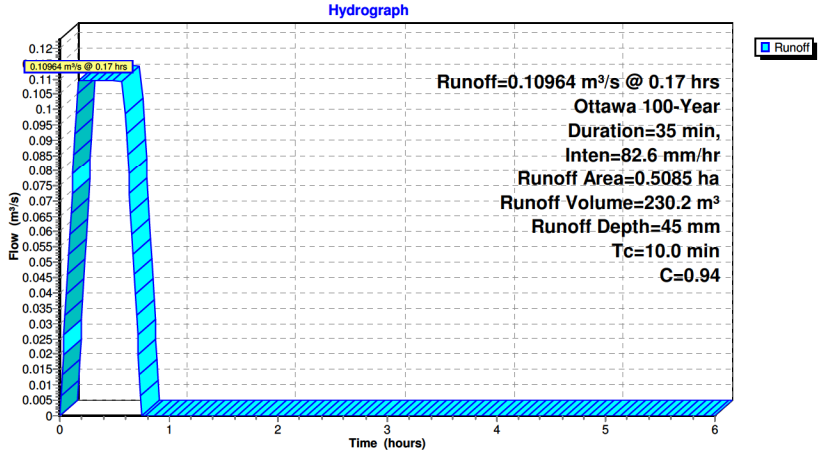
Runoff = 0.10964 m³/s @ 0.17 hrs, Volume= 230.2 m³, Depth= 45 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=35 min, Inten=82.6 mm/hr

Area (ha)	C	Description
0.2400	1.00	PR-002
0.1322	1.00	PR-003
0.0490	0.94	PR-004
0.0559	0.75	PR-005
0.0314	0.53	PR-006
0.5085	0.94	Weighted Average
0.1363		26.80% Pervious Area
0.3722		73.20% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 270S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 271S: OF-002 (Sprinhurst Ave - Uncontrolled)

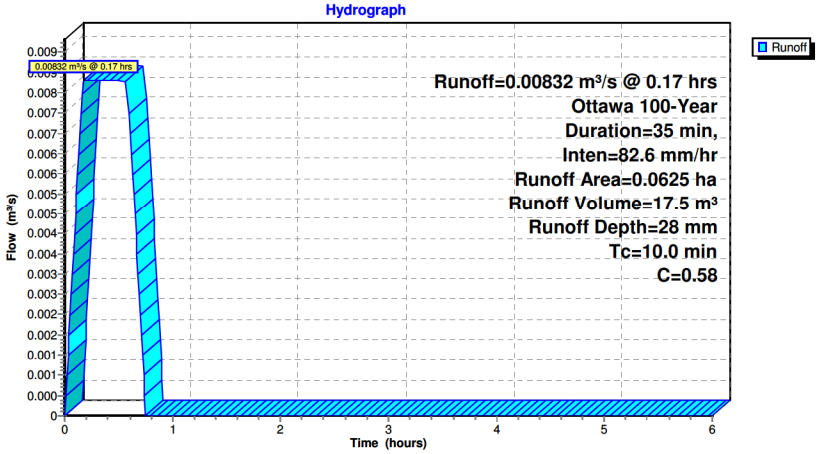
Runoff = 0.00832 m³/s @ 0.17 hrs, Volume= 17.5 m³, Depth= 28 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=35 min, Inten=82.6 mm/hr

Area (ha)	C	Description
0.0365	0.31	PR-007
0.0209	0.96	PR-008
0.0051	1.00	PR-009
0.0625	0.58	Weighted Average
0.0365		58.40% Pervious Area
0.0260		41.60% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 271S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 255P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 73.20% Impervious, Inflow Depth = 45 mm for 100-Year event
Inflow = 0.10964 m³/s @ 0.17 hrs, Volume= 230.2 m³
Outflow = 0.05422 m³/s @ 0.67 hrs, Volume= 207.6 m³, Atten= 51%, Lag= 29.9 min
Primary = 0.05422 m³/s @ 0.67 hrs, Volume= 207.6 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 62.233 m @ 0.67 hrs Surf.Area= 0.0 m² Storage= 159.5 m³

Plug-Flow detention time= 51.5 min calculated for 207.6 m³ (90% of inflow)
Center-of-Mass det. time= 49.7 min (72.2 - 22.5)

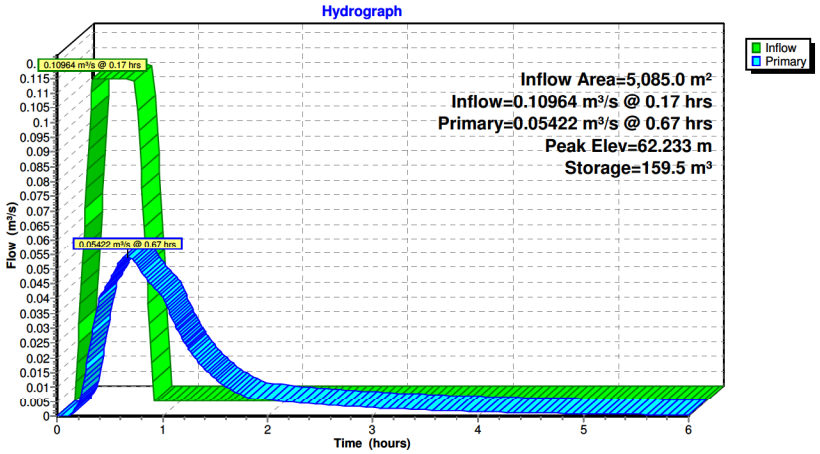
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.05421 m³/s @ 0.67 hrs HW=62.233 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.05421 m³/s)

Pond 255P: Storage Unit

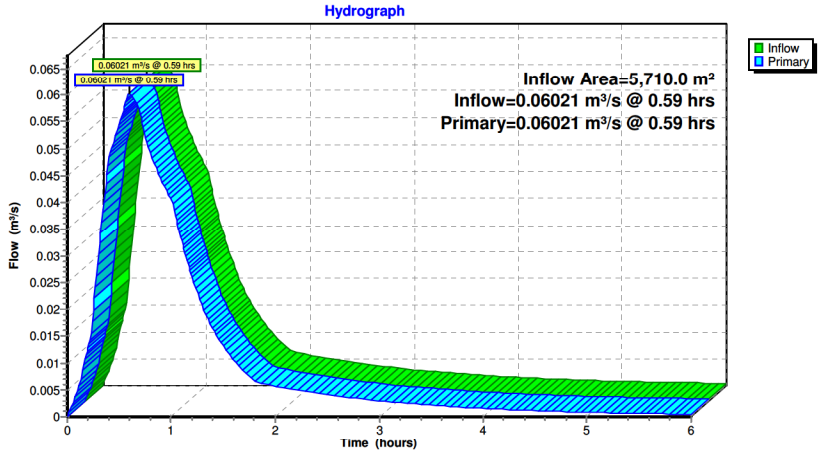


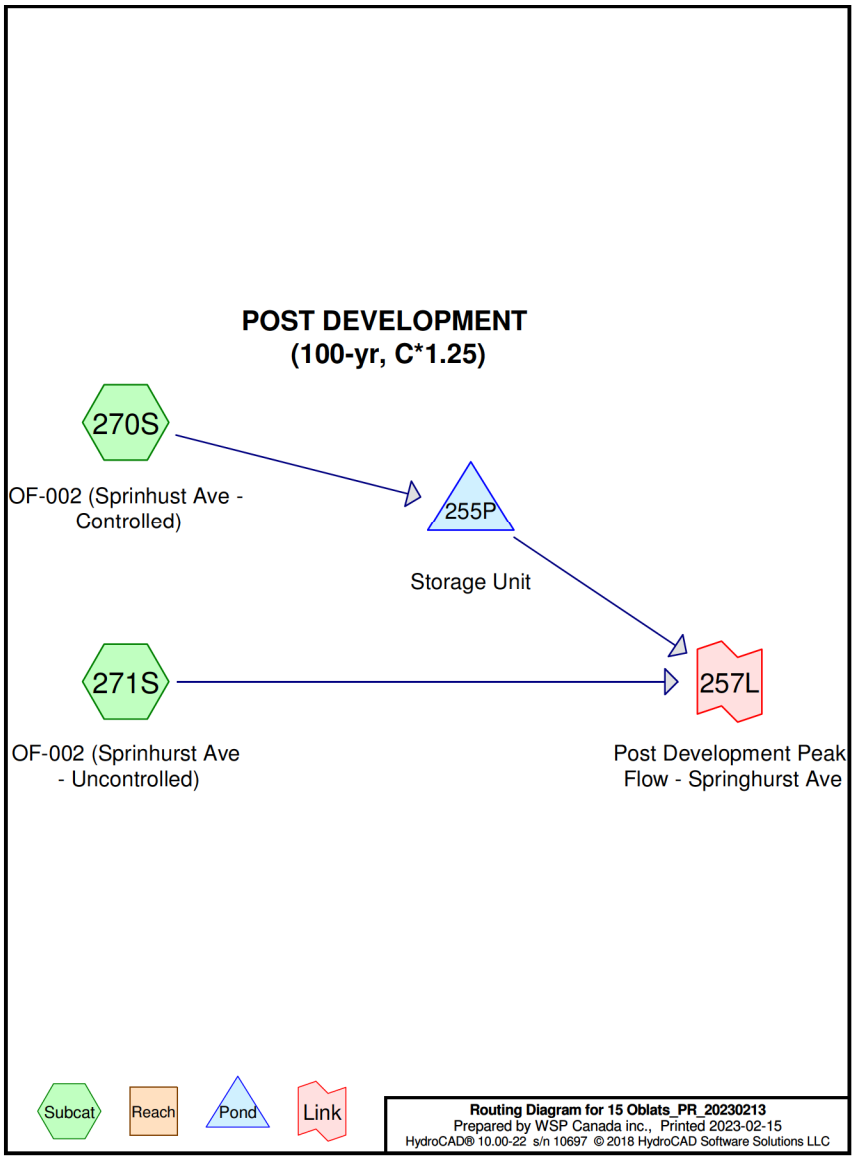
Summary for Link 257L: Post Development Peak Flow - Springhurst Ave

Inflow Area = 5,710.0 m², 69.74% Impervious, Inflow Depth > 39 mm for 100-Year event
Inflow = 0.06021 m³/s @ 0.59 hrs, Volume= 225.0 m³
Primary = 0.06021 m³/s @ 0.59 hrs, Volume= 225.0 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 257L: Post Development Peak Flow - Springhurst Ave





Area Listing (selected nodes)

Area (sq-meters)	C	Description (subcatchment-numbers)
2,400.0	1.00	PR-002 (270S)
1,322.0	1.00	PR-003 (270S)
490.0	0.94	PR-004 (270S)
559.0	0.75	PR-005 (270S)
314.0	0.53	PR-006 (270S)
365.0	0.31	PR-007 (271S)
209.0	0.96	PR-008 (271S)
51.0	1.00	PR-009 (271S)
5,710.0	**0.90**	**TOTAL AREA**

Time span=0.00-6.00 hrs, dt=0.01 hrs, 601 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 270S: OF-002 (Sprinhust Runoff Area=0.5085 ha 73.20% Impervious Runoff Depth=46 mm
Tc=10.0 min C=0.94 Runoff=0.10750 m³/s 232.2 m³

Subcatchment 271S: OF-002 (Sprinhurst Runoff Area=0.0625 ha 41.60% Impervious Runoff Depth=28 mm
Tc=10.0 min C=0.58 Runoff=0.00815 m³/s 17.6 m³

Pond 255P: Storage Unit Peak Elev=62.234 m Storage=159.6 m³ Inflow=0.10750 m³/s 232.2 m³
Outflow=0.05424 m³/s 209.6 m³

Link 257L: Post Development Peak Flow - Springhurst Ave Inflow=0.06018 m³/s 227.2 m³
Primary=0.06018 m³/s 227.2 m³

Total Runoff Area = 5,710.0 m² Runoff Volume = 249.8 m³ Average Runoff Depth = 44 mm
30.26% Pervious = 1,728.0 m² 69.74% Impervious = 3,982.0 m²

Summary for Subcatchment 270S: OF-002 (Sprinhust Ave - Controlled)

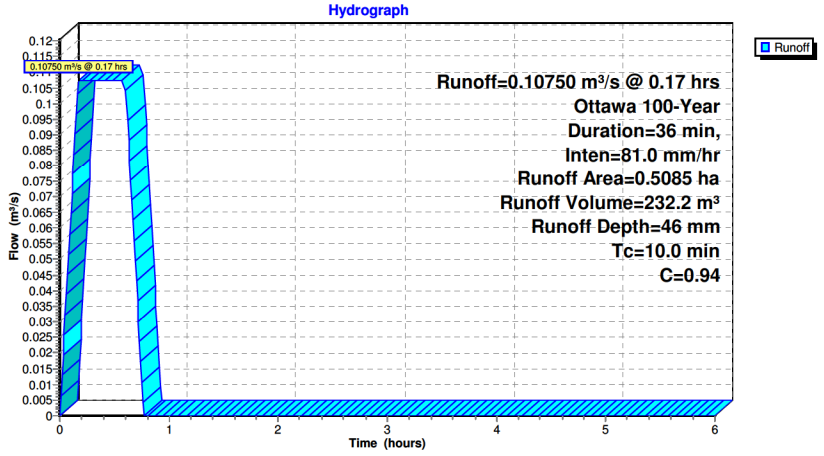
Runoff = 0.10750 m³/s @ 0.17 hrs, Volume= 232.2 m³, Depth= 46 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=36 min, Inten=81.0 mm/hr

Area (ha)	C	Description
0.2400	1.00	PR-002
0.1322	1.00	PR-003
0.0490	0.94	PR-004
0.0559	0.75	PR-005
0.0314	0.53	PR-006
0.5085	0.94	Weighted Average
0.1363		26.80% Pervious Area
0.3722		73.20% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 270S: OF-002 (Sprinhust Ave - Controlled)



Summary for Subcatchment 271S: OF-002 (Sprinhurst Ave - Uncontrolled)

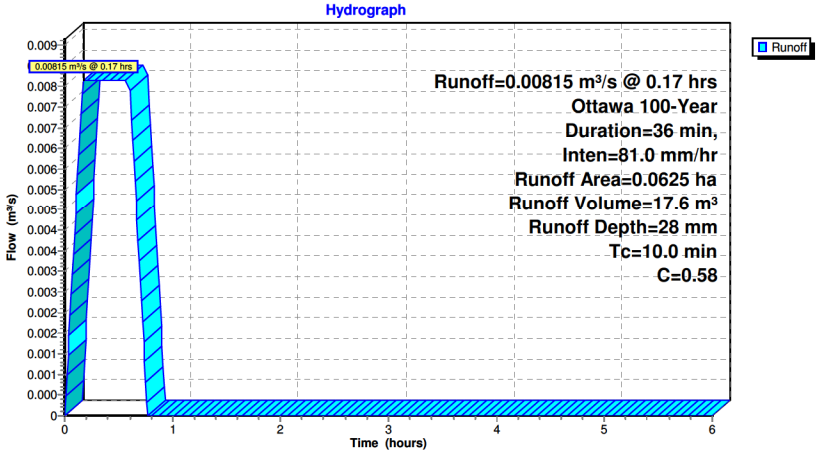
Runoff = 0.00815 m³/s @ 0.17 hrs, Volume= 17.6 m³, Depth= 28 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Ottawa 100-Year Duration=36 min, Inten=81.0 mm/hr

Area (ha)	C	Description
0.0365	0.31	PR-007
0.0209	0.96	PR-008
0.0051	1.00	PR-009
0.0625	0.58	Weighted Average
0.0365		58.40% Pervious Area
0.0260		41.60% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 271S: OF-002 (Sprinhurst Ave - Uncontrolled)



Summary for Pond 255P: Storage Unit

[44] Hint: Outlet device #1 is below defined storage

Inflow Area = 5,085.0 m², 73.20% Impervious, Inflow Depth = 46 mm for 100-Year event
Inflow = 0.10750 m³/s @ 0.17 hrs, Volume= 232.2 m³
Outflow = 0.05424 m³/s @ 0.68 hrs, Volume= 209.6 m³, Atten= 50%, Lag= 30.8 min
Primary = 0.05424 m³/s @ 0.68 hrs, Volume= 209.6 m³

Routing by Stor-Ind method, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs
Peak Elev= 62.234 m @ 0.68 hrs Surf.Area= 0.0 m² Storage= 159.6 m³

Plug-Flow detention time= 51.0 min calculated for 209.2 m³ (90% of inflow)
Center-of-Mass det. time= 49.6 min (72.6 - 23.0)

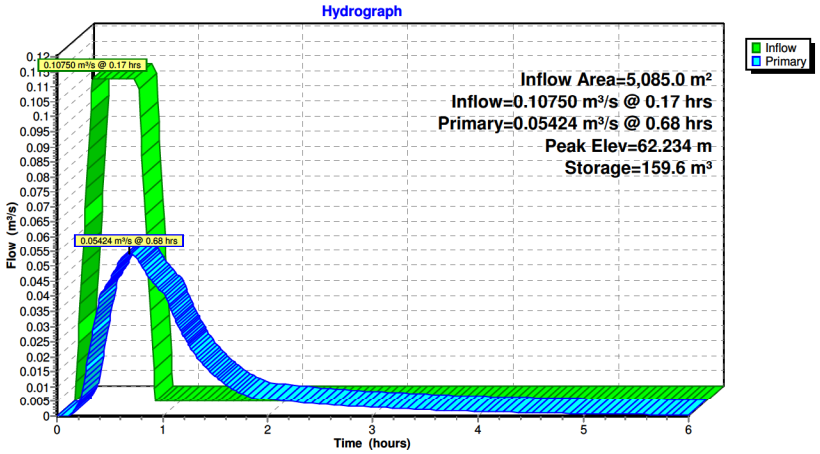
Volume	Invert	Avail.Storage	Storage Description
#1	60.600 m	169.4 m³	**Custom Stage Data** Listed below

Elevation (meters)	Cum.Store (cubic-meters)
60.600	0.0
60.800	24.3
61.000	48.0
61.260	76.6
61.610	113.5
61.790	129.9
62.000	145.5
62.200	157.6
62.400	169.4

Device	Routing	Invert	Outlet Devices
#1	Primary	60.570 m	**HYDROVEX 200-VHV-2 X 0.92** Head (meters) 0.000 0.200 0.500 1.000 1.500 2.000 2.500 3.000 4.000 5.000 6.000 Disch. (m³/s) 0.000000 0.000100 0.007000 0.044000 0.056000 0.065000 0.073000 0.082000 0.094000 0.112000 0.135000

Primary OutFlow Max=0.05424 m³/s @ 0.68 hrs HW=62.234 m (Free Discharge)
1=HYDROVEX 200-VHV-2 (Custom Controls 0.05424 m³/s)

Pond 255P: Storage Unit

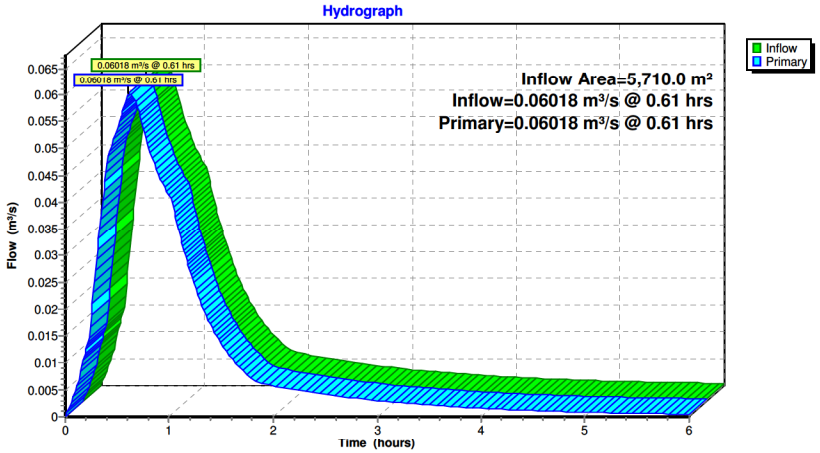


Summary for Link 257L: Post Development Peak Flow - Springhurst Ave

Inflow Area = 5,710.0 m², 69.74% Impervious, Inflow Depth > 40 mm for 100-Year event
Inflow = 0.06018 m³/s @ 0.61 hrs, Volume= 227.2 m³
Primary = 0.06018 m³/s @ 0.61 hrs, Volume= 227.2 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-6.00 hrs, dt= 0.01 hrs

Link 257L: Post Development Peak Flow - Springhurst Ave



APPENDIX

D SUPPORTING DOCUMENTS

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

15 OBLATS AVENUE

OTTAWA, ON, CANADA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

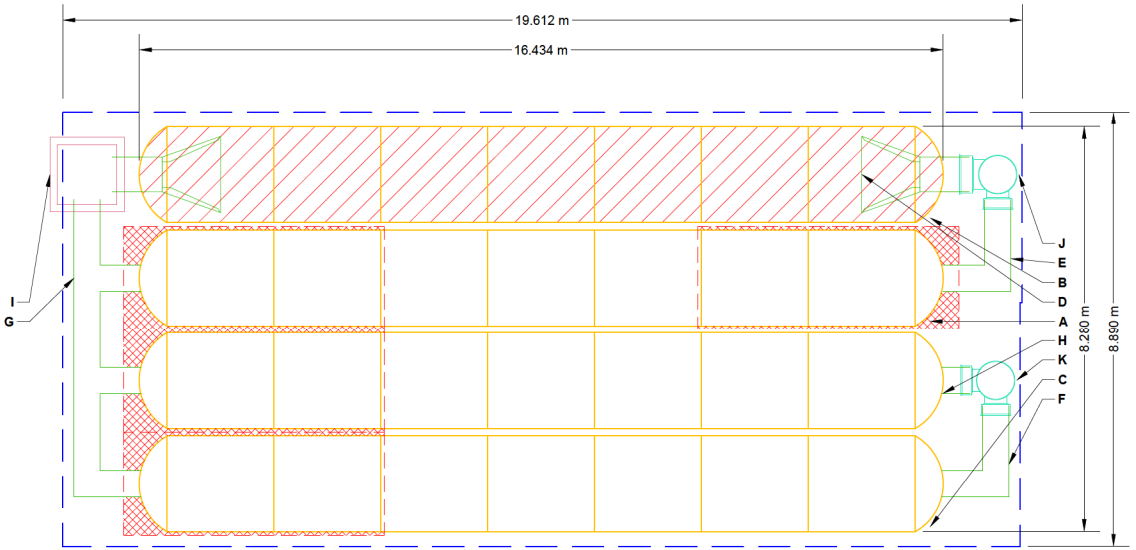
CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT	
28	STORMTECH MC-3500 CHAMBERS
8	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	STONE VOID
171.1	INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
174.1	SYSTEM AREA (m²)
57.0	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS:	
MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	64.133
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	62.304
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	62.152
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	62.152
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	62.152
TOP OF STONE:	61.999
TOP OF MC-3500 CHAMBER:	61.695
450 mm x 450 mm TOP MANIFOLD INVERT:	61.060
450 mm x 450 mm TOP MANIFOLD INVERT:	61.060
600 mm ISOLATOR ROW PLUS INVERT:	60.604
600 mm ISOLATOR ROW PLUS INVERT:	60.604
450 mm x 450 mm BOTTOM MANIFOLD INVERT:	60.597
450 mm BOTTOM CONNECTION INVERT:	60.597
BOTTOM OF MC-3500 CHAMBER:	60.552
BOTTOM OF STONE:	60.323

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	450 mm TOP CORED END CAP, PART#: MC3500IEPP18TC / TYP OF ALL 450 mm TOP CONNECTIONS	509 mm	
PREFABRICATED END CAP	B	600 mm BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
PREFABRICATED END CAP	C	450 mm BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	45 mm	
FLAMP	D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP (TYP 2 PLACES)		
MANIFOLD	E	450 mm x 450 mm TOP MANIFOLD, ADS N-12	509 mm	
MANIFOLD	F	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	45 mm	
MANIFOLD	G	450 mm x 450 mm TOP MANIFOLD, ADS N-12	509 mm	
PIPE CONNECTION	H	450 mm BOTTOM CONNECTION	45 mm	
CONCRETE STRUCTURE	I	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		
NYLOPLAST (INLET W/ ISO PLUS ROW)	J	750 mm DIAMETER (610 mm SUMP MIN)		
NYLOPLAST (OUTLET)	K	750 mm DIAMETER (DESIGN BY ENGINEER)		227 L/s OUT



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 5.334 m OF ADSPLUS125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

15 OBLATS AVENUE
OTTAWA, ON, CANADA
DATE: 08/19/2024 | DRAWN: HN | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

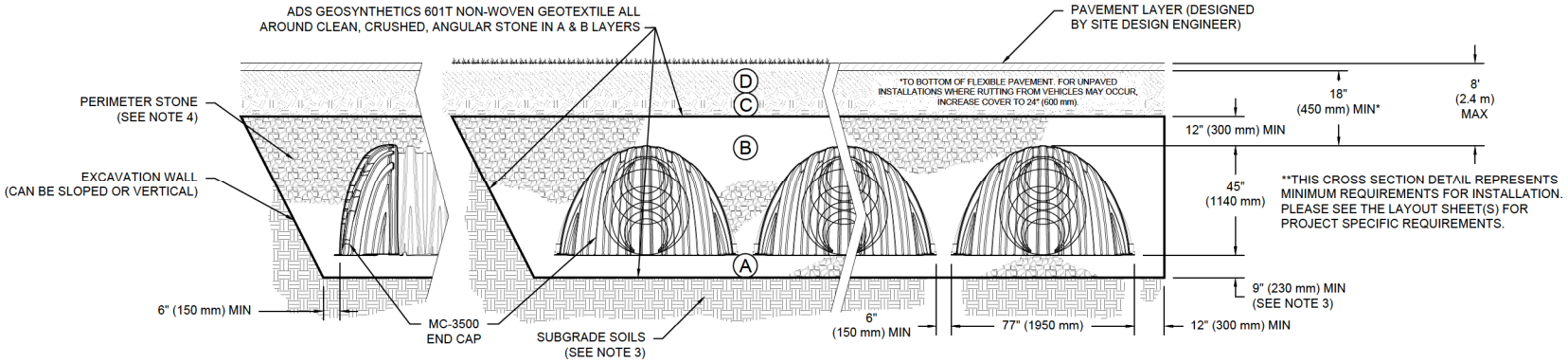
SCALE = 1 : 100

SHEET
2 OF 6

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

	MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

15 OBLATS AVENUE
OTTAWA, ON, CANADA
DATE: 08/19/2024 | DRAWN: HN | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

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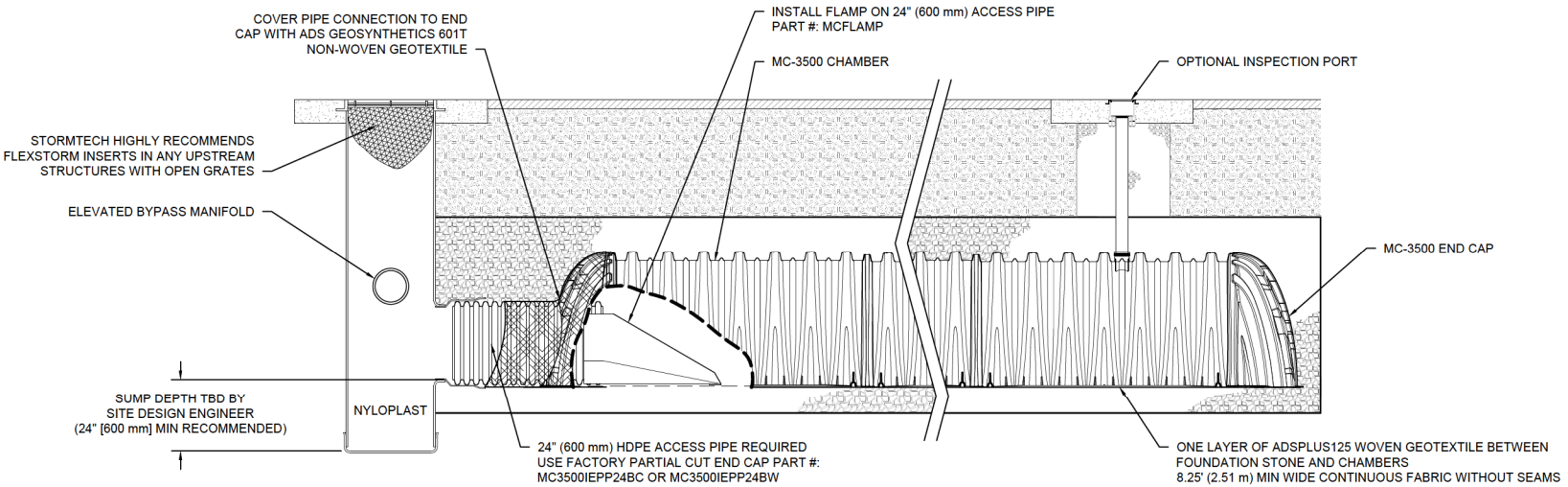
HILLIARD, OH 43026
1-800-733-7473

SHEET
3 OF 6



MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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MC-3500 TECHNICAL SPECIFICATION

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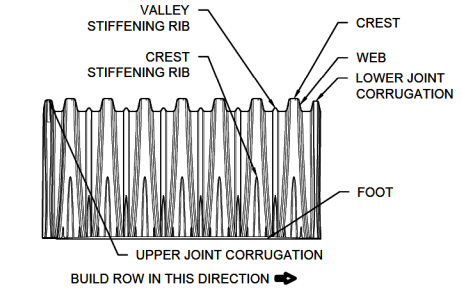
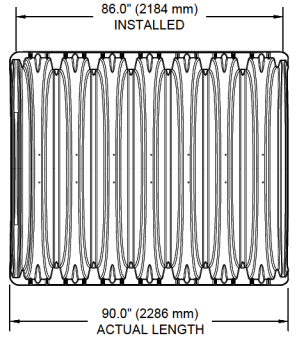
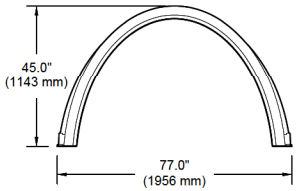
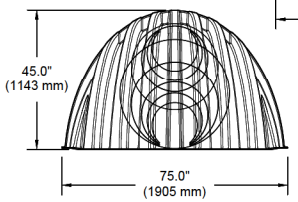
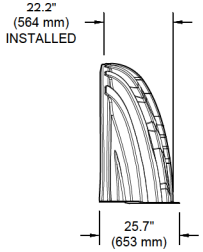










NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

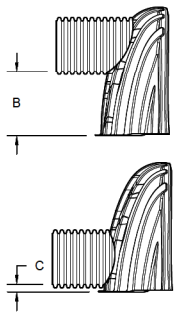
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

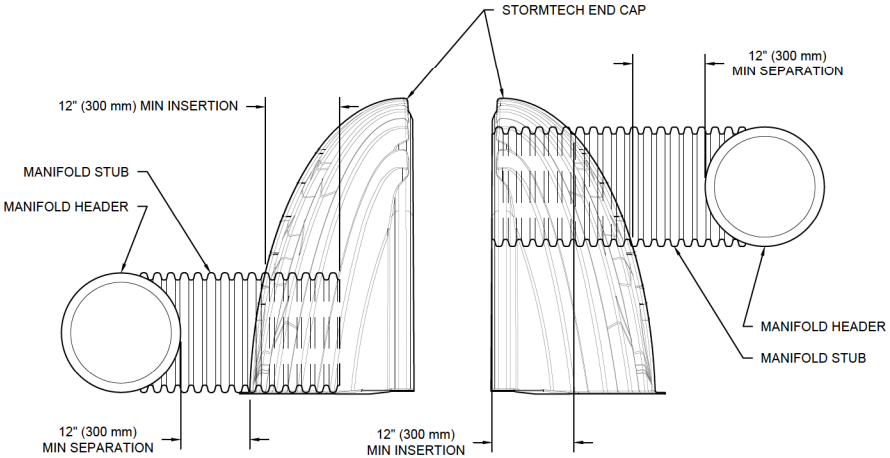
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

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NYLOPLAST DRAIN BASIN

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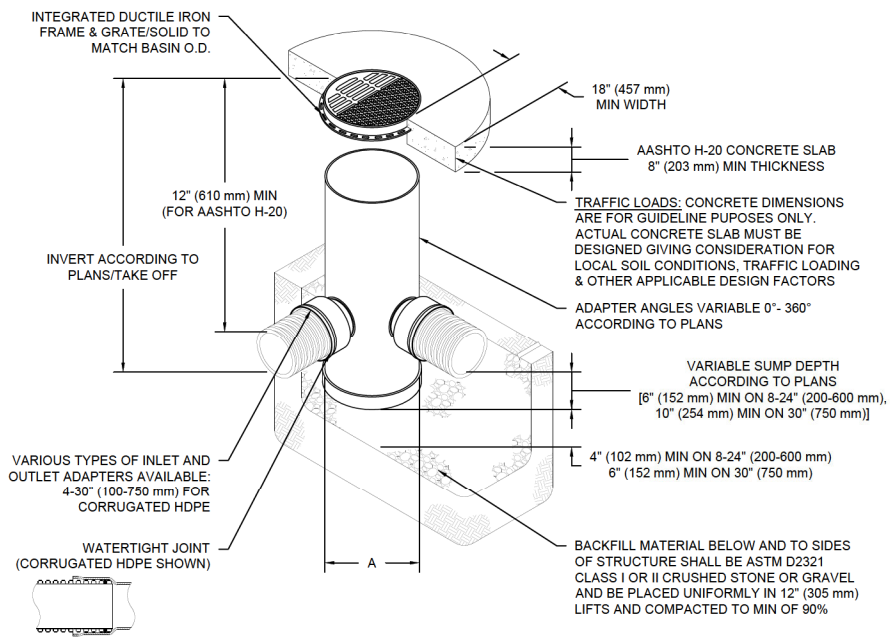

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

15 OBLATS AVENUE
OTTAWA, ON, CANADA
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Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

02/14/2023

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	15 Oblats

Drainage Area (ha):	0.51
% Imperviousness:	88.00

Runoff Coefficient 'c': 0.82

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	13.63
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	60.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	15 Oblats
Project Number:	221-02976-00
Designer Name:	Kathryn Kerker
Designer Company:	WSP
Designer Email:	kathryn.kerker@wsp.com
Designer Phone:	613-690-1206
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	85
EFO6	93
EFO8	97
EFO10	99
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 85

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

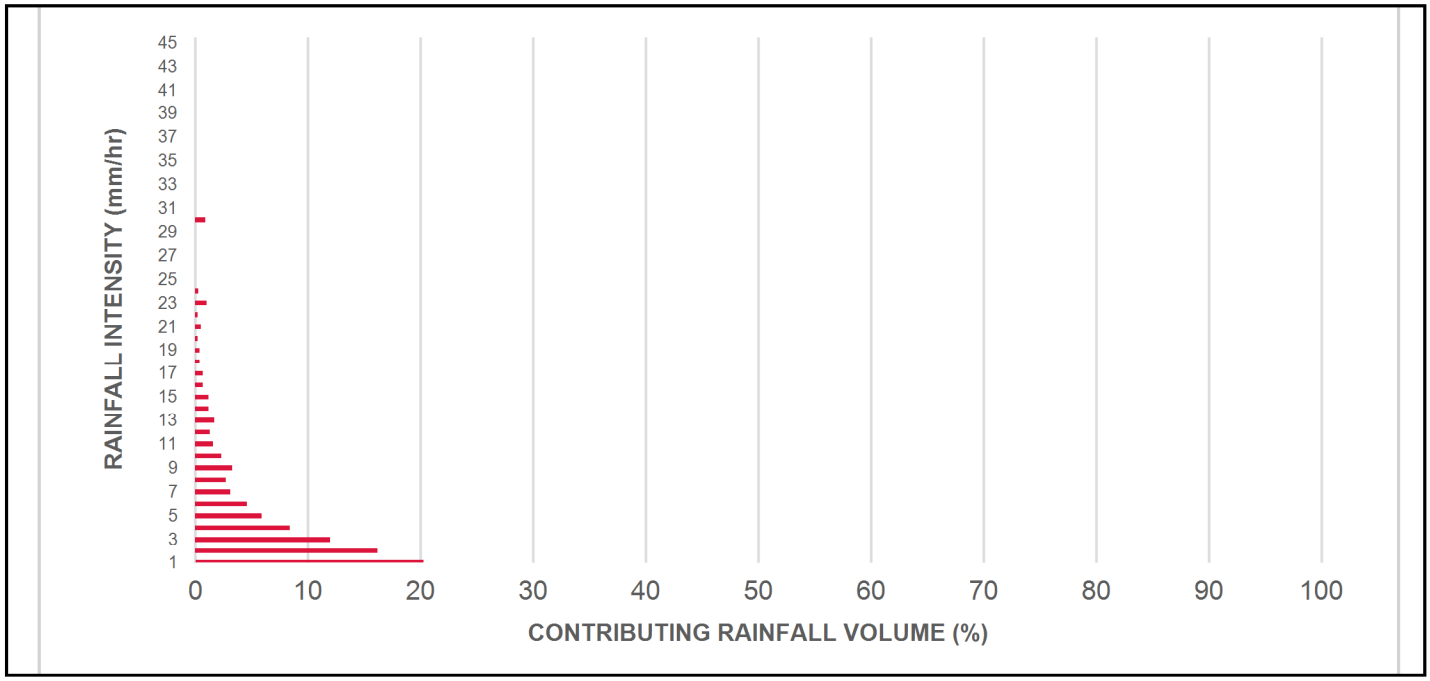
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

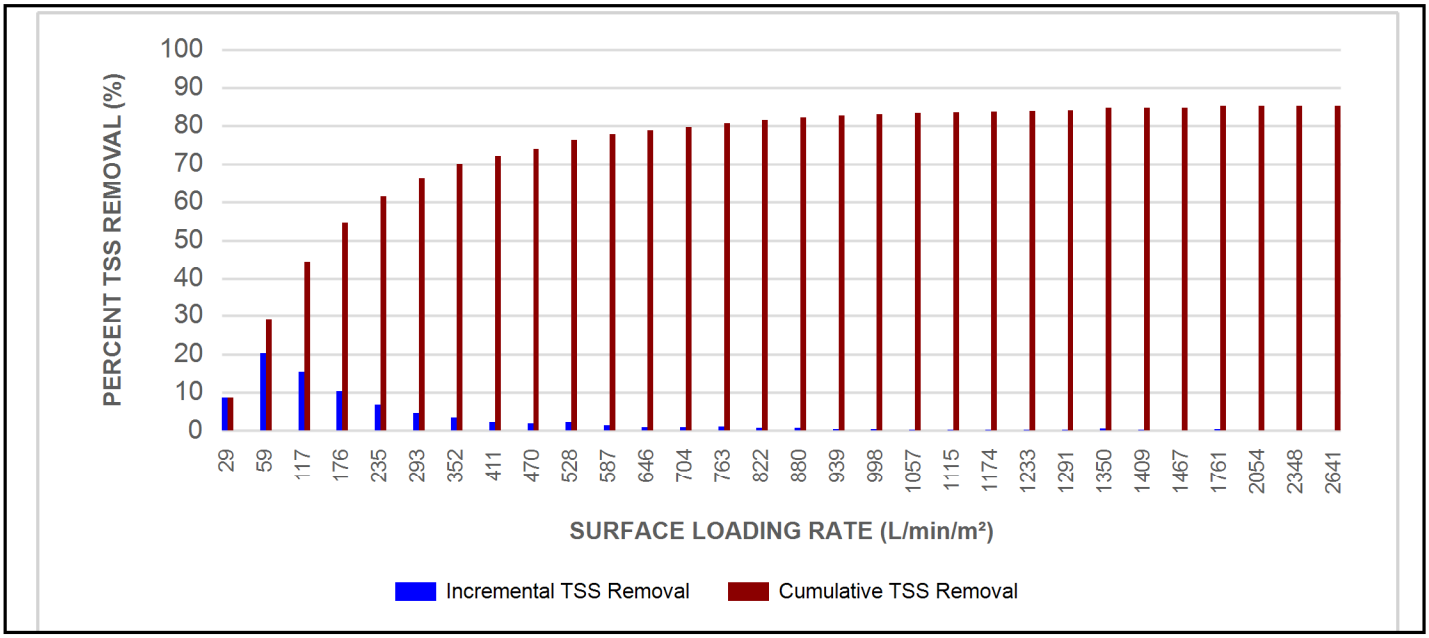
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	8.6	8.6	0.59	35.0	29.0	100	8.6	8.6
1	20.3	29.0	1.17	70.0	59.0	100	20.3	29.0
2	16.2	45.2	2.35	141.0	117.0	95	15.3	44.3
3	12.0	57.2	3.52	211.0	176.0	87	10.4	54.7
4	8.4	65.6	4.70	282.0	235.0	82	6.9	61.6
5	5.9	71.6	5.87	352.0	293.0	79	4.7	66.3
6	4.6	76.2	7.04	423.0	352.0	76	3.5	69.9
7	3.1	79.3	8.22	493.0	411.0	73	2.2	72.1
8	2.7	82.0	9.39	563.0	470.0	71	1.9	74.0
9	3.3	85.3	10.57	634.0	528.0	68	2.3	76.3
10	2.3	87.6	11.74	704.0	587.0	66	1.5	77.8
11	1.6	89.2	12.91	775.0	646.0	64	1.0	78.8
12	1.3	90.5	14.09	845.0	704.0	64	0.8	79.7
13	1.7	92.2	15.26	916.0	763.0	63	1.1	80.8
14	1.2	93.5	16.44	986.0	822.0	63	0.8	81.5
15	1.2	94.6	17.61	1057.0	880.0	62	0.7	82.3
16	0.7	95.3	18.78	1127.0	939.0	62	0.4	82.7
17	0.7	96.1	19.96	1197.0	998.0	62	0.5	83.1
18	0.4	96.5	21.13	1268.0	1057.0	60	0.2	83.4
19	0.4	96.9	22.30	1338.0	1115.0	59	0.2	83.6
20	0.2	97.1	23.48	1409.0	1174.0	58	0.1	83.7
21	0.5	97.5	24.65	1479.0	1233.0	56	0.3	84.0
22	0.2	97.8	25.83	1550.0	1291.0	55	0.1	84.1
23	1.0	98.8	27.00	1620.0	1350.0	53	0.5	84.7
24	0.3	99.1	28.17	1690.0	1409.0	52	0.1	84.8
25	0.9	100.0	29.35	1761.0	1467.0	50	0.5	85.3
30	0.9	100.9	35.22	2113.0	1761.0	42	0.4	85.7
35	-0.9	100.0	41.09	2465.0	2054.0	36	N/A	85.3
40	0.0	100.0	46.96	2817.0	2348.0	31	0.0	85.3
45	0.0	100.0	52.83	3170.0	2641.0	28	0.0	85.3
						Estimated Net Annual Sediment (TSS) Load Reduction =		**85 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

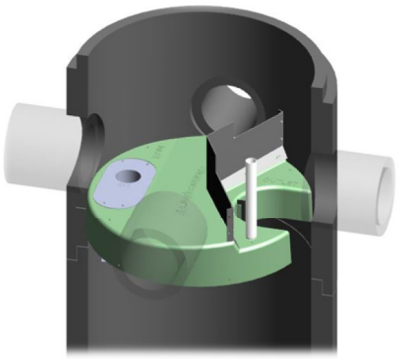
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

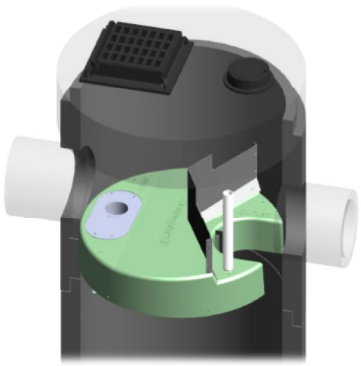
DESIGN FLEXIBILITY

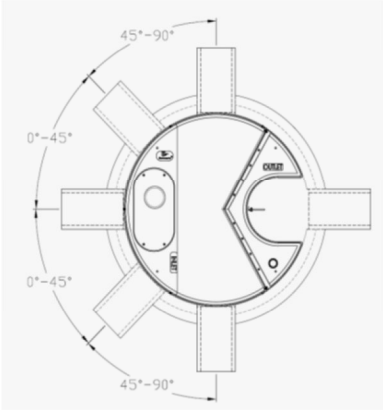
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

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STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.